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 BK. CENTRE

VOL. XVI • NO. 9

British Edition

NOVEMBER

1960

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Astounding Science Fact & Fiction (British Edition) is published monthly and distributed by ATLAS PUBLISHING & DISTRIBUTING CO. LTD., 18 Bride Lane, London, E.C.4, by arrangement with Street & Smith Publications Inc., 575 Madison Avenue, New York, 22, New York, U.S.A. Sole Agents for Australia & New Zealand: GORDON & GOYCE (AUSTRALASIA) LTD.

Annual Subscriptions
 27/6 Post Free (12 issues)

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Printed in Great Britain by
 Morrison & Gibb Limited
 London and Edinburgh

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JOHN W. CAMPBELL, JR.

127, SHEPHERDS BUSH RD.

LONDON, W.6.



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Illustrations by Berniklau, Schoenherr
 and van Dongen

KAY TARRANT
 Assistant Editor

UNIMAGINABLE REASONS

IT'S fairly natural to feel that, if a thing is reasonable, an intelligent, reasonable person can understand the reasons behind it. The resultant syllogismic type thinking taking off from that postulate is, I suspect, one of the major sources of human conflict. "If what you want to do is reasonable, and, you claim, I can't understand it, then you are maintaining that I am unintelligent, unreasonable, and incapable of learning. You are insulting my intelligence!"

And that sounds so logical, so reasonable, really . . .

The process of growing up is full of frustrating, embarrassing, and distinctly painful discoveries about the nature of unimaginable—and hence incomprehensible—reasons. The discomfort of those frustrations, embarrassments and painful discoveries is sufficient to make us prefer not to recall that, within our own, inner, personal experience, we have instance after instance of perfectly valid and perfectly unimaginable reason situations.

The small boy, in angry frustration at his arbitrary, dictatorial, unreasonable parents, promises himself "When I grow up and they can't oppress me this way, I'm going to have all the ice cream I want! I'll have ice cream for breakfast and lunch and dinner. And I'll *never* eat those doggone vegetables!"

So he grows up and breaks his promise to himself. He eats vegetables two meals out of three, and has ice cream perhaps twice a month. And his reasons remain utterly unimaginable to the small boys around him.

And, at forty, he's appalled at the insane appetite his fifteen-year-old son displays. The boy must be sick; there is no imaginable reason for the boy to consume two large slabs of roast beef, four potatoes, three slices of bread, two glasses of milk, and then ask hungrily about dessert.

Of course it's unimaginable to a forty-year-old man. Medical researchers did some experiments, however, and found that fourteen- to seventeen-year-old boys could consume, *and utilize*, literally any given quantity of food, up to and including six thousand calories a day. To eat six thousand calories of food in twelve hours of waking time requires nearly continuous operation of the jaws, which explains the teen-age tendency to eat on the run. A lumberjack felling trees in the north woods in midwinter consumes about four thousand calories a day, just by way of comparison.

However, there are two broad classes of promises to self; the "Some day I will . . ." class, and the "I'll *never* do that sort of thing!" The latter type is apt to be the source of more direct self-induced mental anguish; after all, the "some day I will . . ." type has the characteristic that even fifty years later, there still could come that some day, so you haven't certainly failed your self-promise. But the "I *never* will . . ." is smashed the first time you do.

Typical of the "I'll never do . . ." is the twelve- to fourteen-year-old boy's repugnance reaction to "that mush about girls"—something he knows he'll *never* lower himself to.

When in the course of time he does act in that repugnant manner—he does so for completely unimaginable reasons. At least—they are, and forever will remain, unimaginable and uncommunicable for a twelve- to fourteen-year-old boy. He has to stop being a pubescent boy before it becomes possible to imagine those reasons.

It is just as impossible to explain to a true barbarian that he is not a gentleman; the validity of the gentleman's motivations are unimaginable reasons to the barbarian.

Time and again, the achievement of a longed for ability, power, freedom, whatever it may be, carries with it such side effects of broadened comprehension that the original motivation for seeking the power is frustrated by its achievement. The boy who longs for the time when he'll be big, strong, and smart enough to defeat his dictatorial, arbitrary old man . . . finds that, in the process of achieving that state, he has, somehow, also acquired the realization that the old man was fundamentally right. Now he has the power to defeat him—and has lost the motivation.

The peasant sees the king ride by, and dreams "If I were king, things would be different! I'd have all the women I wanted—a new one every night! And people would do what I said, and no arguments with me, or I'd kill 'em! I'd have all the money I wanted, and . . ."

And the king, riding by, is being told by his finance minister that he can *not* go on supporting that astrologer with his plan to map all the stars in the sky, because the wheat crop in the South province failed, and the people there face ruin. It's a one-crop economy, and His Majesty was told again and again that that province *must* be made to give up that stupid system.

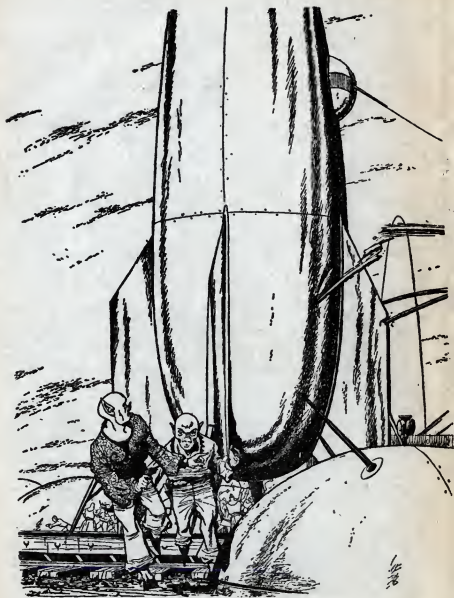
And the king sighs; Baron Garmil, whose province it is, is an utterly, unswervingly honest man—and as utterly and fanatically bull-headed as most utterly honest men tend to be. He is, also, far and away the most brilliant military strategist in the realm—and, in all honesty, probably the most brilliant in the current era. The finance minister sees the necessity of changing the South Province; the king sees the impossibility, because it can be done only over Garmil's dead body. And (1) it's doubtful that anyone can achieve that, and (2) Garmil's too necessary to the realm anyway.

Complicating the king's effort to think that one out is a pretty little bit of fluff who persists in chattering at all the wrong moments, and has been trying to crawl into the royal bed for the last week, to the king's weary annoyance.

The small-boy-grown-up *does* eat all the ice cream he wants, just as he promised himself . . . only he wants very little. And just as the peasant visualizes it, the king does have all the women he wants—save that the king wants only one, for reasons quite beyond the peasant's imagining.

There's an extension of this consideration that fits in with an old problem of science fiction. From what we now know of the Universe, there must be, in this galaxy alone, millions of life-bearing planets. Our Solar System appears to be approximately five billion years old; from what we now understand of stellar evolution, Sol must be a "second generation sun." That is, the gas-and-dust cloud from which Sol condensed, must have been debris blasted out from an exploding older star—or stars—which had

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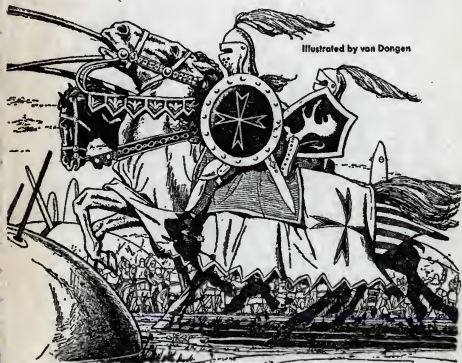


THE HIGH CRUSADE

By POUL ANDERSON

It is easy—but markedly dangerous—to consider that ignorance, stupidity, and folly are the same thing. The invading aliens naturally knew ignorance when they saw it. . . .

Illustrated by van Dongen



AS the captain looked up, the hooded desk lamp threw his face into ridges of darkness and craggy highlights. A port stood open to alien summer night.

"Well?" he said.

"I've got it translated, sir," answered the sociotechnician. "Had to extrapolate backward from modern languages, which is what took me so long. In the course of the work, though, I've learned enough so I can talk to these . . . creatures."

"Good," grunted the captain. "Now maybe we can discover what this is all about. Thunder and blow-up! I expected to come across almost anything out here, but this—!"

"I know how you feel, sir. Even with all the physical evidence right before my eyes, I found it hard to believe the original account."

"Very well, I'll read it at once. No rest for the wicked." The captain nodded dismissal and the sociotech departed the cabin.

For a moment the captain sat motionless, looking at the document but not really seeing it. The book itself had been impressively ancient, uncials on vellum between massive covers. This translation was a prosaic typescript. Yet he was nearly afraid to turn the pages: afraid of what he might find out. There had been some stupendous catastrophe, more than a thousand years ago; its consequences were still echoing. The captain felt very small and alone. Home was a long ways of.

However—

He began to read.

I.

Archbishop William, a most learned and holy prelate, having commanded me to put into English writing those great events to which I was a humble witness, I take up my quill in the name of the Lord and my patron saint: trusting that they will aid my feeble powers of narrative for the sake of future generations who may with profit study the account of Sir Roger de Tourneville's campaign and learn thereby fervently to reverence the great God by Whom all things are brought to pass.

I shall write of these happenings exactly as I remember them, without fear or favor, the more so since most who were concerned are now dead. I myself was quite insignificant, but since it is well to make known the chronicler that men may judge his trustworthiness, let me first say a few words about him.

I was born some forty years before my story begins, a younger son of Wat Brown. He was blacksmith in the little town of Ansby, which lay in northeastern Lincolnshire. The lands were enfeoffed to the Baron de Tourneville, whose ancient castle stood on a hill just above the town. There was also a small abbey of the Franciscan order, which I entered as a boy. Having gained some skill—my only skill, I fear—in reading and writing, I was often made instructor in these arts to novices and the children of lay people. My boyhood nickname I put into Latin and made my religious one, as a lesson in humility, so I am Brother Parvus. For I am of low size, and ill-favored, though fortunate to have the trust of children.

In the year of grace 1345, Sir Roger, then baron, was gathering an army of free companions to join our puissant King Edward III and his son in the French war. Ansby was the meeting place. By May Day, the army was all there. It camped on the common, but turned our quiet town into one huge brawl. Archers, crossbowmen, pikemen, and cavalry swarmed through the muddy streets, drinking, gaming, wenching, jesting, and quarreling, to the peril of their souls and our thatch-roofed cottages. Indeed, we lost two houses to fire. Yet they brought an unwonted ardor, a sense of glory, such that the very serfs thought wistfully about going along, were it but possible. Even I entertained such notions. For me it might well have come true, for I had been tutoring Sir Roger's son and had also brought his accounts in order. The baron talked of making me his amanuensis; but my abbot was doubtful.

Thus it stood when the Wersgor ship arrived.

Well I remember the day. I was out on an errand. The weather had turned sunny after rain, the town street was ankle-deep in mud. I picked my way through the aimless crowds of soldiery, nodding to such as I knew. All at once a great cry arose. I lifted my head like the others.

Lo! It was as a miracle! Down through the sky, seeming to swell monstrously with the speed of its descent, came a ship all of metal. So dazzling was the sunlight off its polished sides that I could not see its form clearly. A huge cylinder, I thought, easily two thousand feet long. Save for the whistle of wind, it moved noiseless.

Someone screamed. A woman knelt in a puddle and began to rattle off prayers. A man cried that his sins had found him out, and joined her. Worthy though these actions were, I realized that in such a mass of people, folk would be trampled to death if panic smote. That was surely not what God, if He had sent this visitant, intended.

Hardly knowing what I did, I sprang up on a great iron bombard whose wagon was sunk to the axles in our street. "Hold fast!" I cried. "Be not afraid! Have faith and hold fast!"

My feeble pipings went unheard. Then Red John Hameward, the captain of the longbowmen, leaped up beside me. A merry giant, with hair like spun copper and fierce blue eyes, he had been my friend since he arrived here.

"I know not what yon thing is," he bellowed. His voice rolled over the general babble, which died away. "Mayhap some French trick. Or it may be friendly, which would make our fear look all the sillier. Follow me, every soldier, to meet it when it lands!"

"Magic!" cried an old man. "'Tis sorcery, and we are undone!"

"Not so," I told him. "Sorcery cannot harm good Christians."

"But I am a miserable sinner," he wailed.

"Saint George and King Edward!" Red John sprang off the tube and dashed down the street. I tucked up my robe and panted after him, trying to remember the formulas of exorcism.

Looking back over my shoulder, I was surprised to see most of the company follow us. They had not so much taken heart from the bowman's example, as they were afraid to be left leaderless. But they followed—into their own camp to snatch weapons, then out onto the common. I saw that

cavalrymen had flung themselves to horse and were thundering downhill from the castle.

Sir Roger de Tourneville, unarmored but wearing sword at hip, led the riders. He shouted and flailed about with his lance. Between them, he and Red John got the rabble whipped into some kind of fighting order. They had scarcely finished when the great ship landed.

It sank deep into pasture earth, its weight was tremendous and I knew not what had borne it so lightly through the air. I saw that it was all enclosed, a smooth shell without poopdeck or forecastle. I did not really expect oars, but part of me wondered—through the hammering of my heart—why there were no sails. However, I did spy turrets, from which poked muzzles like those of bombards.

There fell a shuddering silence. Sir Roger edged his horse up to me where I stood with teeth clapping in my head. "You're a learned cleric, Brother Parvus," he said quietly, though his nostrils were white and his hair dank with sweat. "What d'you make of this?"

"In truth I know not, sire," I stammered. "Ancient stories tell of wizards like Merlin who could fly through the air."

"Could it be . . . divine?" He crossed himself.

"'Tis not for me to say." I looked timidly skyward. "Yet I see no choir of angels."

A muted clank came from the vessel, drowned in one groan of fear as a circular door began to open. But all stood their ground, being Englishmen if not simply too terrified to run.

I glimpsed that the door was double, with a chamber between. A metallic ramp slid forth like a tongue, three yards downward until it touched the earth. I raised my crucifix while Aves pattered from my lips like hail.

One of the crew came forth. Great God, how shall I describe the horror of that first sight? Surely, my mind shrieked, this was a demon from the lowest pits of Hell.

He stood about five feet tall, very broad and powerful, clad in a tunic of silvery sheen. His skin was hairless and deep blue. He had a short thick tail. The ears were long and pointed on either side of his round head; narrow amber eyes glared from a blunt-snouted face; but his brow was high.

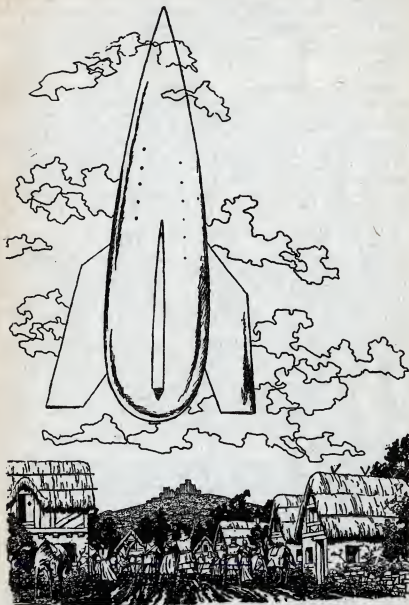
Someone began to scream. Red John brandished his bow. "Quiet, there!" he roared. "'Steeth, I'll kill the first man who moves!"

I hardly thought this a time for profanity. Raising the cross still higher, I forced limp legs to carry me a few steps forward, while I quavered some chant of exorcism. I was certain it would do no good; the end of the world was upon us.

Had the demon only remained standing there, we would soon have broken and bolted. But he raised a tube held in one hand. From it shot flame, blinding white. I heard it crackle in the air and saw a man near me smitten. Fire burst over him. He fell dead, his breast charred open.

Three other demons emerged.

Soldiers were trained to react when such things happened, not to think. The bow of Red John sang. The foremost demon lurched off the ramp with a clothyard arrow through him. I saw him cough blood and die. As if the one shot had touched off a hundred, the air was suddenly gray with



whistling shafts. The three other demons toppled, so thickly studded with arrows they might have been popinjays at a contest.

"They can be slain!" bawled Sir Roger. "Haro! Saint George for Merry England!" And he spurred his horse straight up the gangway.

They say fear breeds unnatural courage. With one crazed whoop the whole army charged after him. Be it confessed, I, too, howled and ran into the ship.

Of that combat which ramped and raged through all the rooms and corridors, I have little memory. Somewhere, from someone, I got a battle-ax. There is in me a confused impression of smiting away at vile blue faces which rose up to snarl at me, of slipping in blood and rising to smite again. Sir Roger had no way to direct the battle. His men simply ran wild. Knowing the demons could be killed, their one thought was to kill and have done.

The crew of the ship numbered about a hundred, but few carried weapons. We later found all manner of devices stored in the holds, but the invaders had relied on creating a panic. Not knowing Englishmen, they had not expected trouble. The ship's artillery was ready to use, but of no value once we were inside.

In less than an hour, we had hunted them all down.

Wading out through the carnage, I wept with joy to feel the blessed sunlight again. Sir Roger was checking with his captains to find our losses, which were only fifteen all told. As I stood there, atremble with exhaustion, Red John Hameward emerged. He had a demon slung over his shoulder.

He threw the creature at Sir Roger's feet. "This one I knocked out with my fist, sire," he panted. "I thought might be you'd want one kept alive a while, to put him to the question. Or should I not take chances, and slice off his ugly head now?"

Sir Roger considered. Calm had descended upon him; none of us had yet grasped the enormity of this event. A grim smile crossed his lips. He replied in English as fluent as the nobleman's French he more commonly used.

"If these be demons," he said, "they're a poor breed, for they were slain as easily as men. Easier, in sooth. They didn't know more about infighting than my little daughter. Less, for she's given my nose many hefty tweaks. I think chains will hold this fellow safe, eh, Brother Parvus?"

"Yes, my lord," I opined, "though it were best to put some saints' relics and the Host nearby."

"Well, then, take him to the abbey and see what you can get out of him. I'll send a guard along. Come up to dinner this evening."

"Sire," I reproved, "we should hold a great Mass of thanksgiving ere we do anything else."

"Yes, yes," he said impatiently. "Talk to your abbot about it. Do what seems best. But come to dinner and tell me what you've learned."

His eyes grew thoughtful as he stared at the ship.

• II.

I came as ordered, with the approval of my abbot, who saw that here the ghostly and secular arms must be one. The town was strangely quiet as I picked my way through sunset streets. Folk were in church, or huddled

within doors. From the soldiers' camp I could hear yet another Mass. The ship brooded mountainous over all our tiny works.

But we felt heartened, I believe, a little drunk with our success over powers not of this Earth. The smug conclusion seemed inescapable, that God approved of us.

I passed the bailey through a trebled watch and went directly to the great hall. Ansby Castle was old Norman work: gaunt to look on, cold to inhabit. The hall was already dark, lit by candles and a great leaping fire which picked weapons and tapestries out of unrestful shadow. Gentlefolk and the more important commoners of town and army were at table, a buzz of talk, servants scurrying about, dogs lolling on the rushes. It was a comfortingly familiar scene, however much tension underlay it. Sir Roger beckoned me to come sit with him and his lady, a signal honor.

Let me here describe Roger de Tourneville, knight and baron. He was a big, strongly thewed man of thirty years, with gray eyes and bony curve-nosed features. He wore his yellow hair in the usual style of a warrior peer, thick on the crown and shaven below—which somewhat marred an otherwise not unhandsome appearance, for he had ears like jug handles. This, his home district, was poor and backward, and most of his time elsewhere had been spent in war. So he lacked courtly graces, though shrewd and kindly in his fashion. His wife, Lady Catherine, was a daughter of the Viscount de Mornay; most people felt she had married beneath her style of living as well as her station, for she had been brought up at Winchester amidst every elegance and modern refinement. She was very beautiful, with great blue eyes and auburn hair, but somewhat of a virago. They had only two children: Robert, a fine boy of six, who was my pupil, and a three-year-old girl named Matilda.

"Well, Brother Parvus," boomed my lord. "Sit down. Have a stoup of wine—'sblood, this occasion calls for more than ale!" Lady Catherine's delicate nose wrinkled a bit; in her old home, ale was only for commoners. When I was seated, Sir Roger leaned forward and said intently, "What have you found out? Is it a demon we've captured?"

A hush fell over the table. Even the dogs were quiet. I could hear the hearthfire crackle, and ancient banners stir dustily where they hung from the beams overhead. "I think so, my lord," I answered with care, "for he grew very angry when we sprinkled holy water on him."

"Yet he did not vanish in a puff of smoke? Hah! If demons, these are not kin to any I ever heard of. They're mortal as men."

"More so, sire," declared one of his captains, "for they cannot have souls."

"I'm not interested in their blithering souls," snorted Sir Roger. "I want to know about their ship. I've walked through it since the fight. What a by-our-lady whale of a ship! We could put all Ansby aboard, with room to spare. Did you ask the demon why a mere hundred of 'em needed that much space?"

"He does not speak any known language, my lord," I said.

"Nonsense! All demons know Latin, at least. He's just being stubborn."

"Mayhap a little session with your executioner?" asked the knight Sir Owain Montbelle slyly.

"No," I said. "If it please you, best not. He seems very quick at learning."

Already he repeats many words after me, so I do not believe he is merely pretending ignorance. Give me a few days and I may be able to talk with him."

"A few days may be too much," grumbled Sir Roger. He threw the beefbone he had been gnawing to the dogs, and licked his fingers noisily. Lady Catherine frowned and pointed to the water bowl and napkin before him. "I'm sorry, my sweet," he muttered. "I never can remember about these newfangled things."

Sir Owain delivered him from his embarrassment by inquiring: "Why say you a few days may be too long? Surely you are not expecting another ship?"

"No. But the men will be more restless than ever. We were almost ready to depart, and now *this* happens!"

"So? Can we not leave anyhow on the date planned?"

"No, you blockhead!" Sir Roger's fist landed on the table. A goblet jumped. "Cannot you see what a chance this is? It must have been given us by the saints themselves!"

As we sat awestruck, he went on rapidly: "We can take the whole company aboard that thing. Horses, cows, pigs, fowls—we'll not be deviled by supply problems. Women, too, all the comforts of home! Aye, why not even the children? Never mind the crops hereabouts, they can stand neglect for a while and 'tis safer to keep everyone together lest there should be another visitation.

"I know not what powers the ship owns besides flying, but her very appearance will strike such terror we'll scarce need to fight. So we'll take her across the Channel and end the French war inside a month, d'you see? Then we go on and liberate the Holy Land, and get back here in time for hay harvest!"

A long silence ended abruptly in such a storm of cheers that my own weak protests were drowned out. I thought the scheme altogether mad. So, I could see, did Lady Catherine and a few others. But the rest were laughing and shouting till the hall roared.

Sir Roger turned a flushed face to me. "It depends on you, Brother Parvus," he said. "You're the best of us all in matters of language. You must make the demon talk, or teach him how, whichever it is. He's got to show us how to sail that ship!"

"My noble lord—" I quavered.

"Good!" Sir Roger slapped my back so I choked and nearly fell off my seat. "I knew you could do it. Your reward will be the privilege of coming with us!"

Indeed it was as if the town and the army were alike possessed. Surely the one wise course was to send messages posthaste to the bishop, perhaps to Rome itself, begging counsel. But no, they must all go, at once. Wives would not leave their husbands, or parents their children, or girls their lovers. The lowliest serf looked up from his acre and dreamed of freeing the Holy Land and picking up a coffer of gold on the way.

What else can be expected of a folk bred from Saxon, Dane, and Norman?

I returned to the abbey and spent the night on my knees, praying for a sign. But the saints remained noncommittal. After mattins I went with a

heavy heart to my abbot and told him what the baron had commanded. He was wroth at not being allowed immediate communication with the Church authorities, but decided it was best we obey for the nonce. I was released from other duties that I might study how to converse with the demon.

I girded myself and went down to the cell where he was confined. It was a narrow room, half underground, used for penances. Brother Thomas, our smith, had stapled fetters to the walls and chained the creature up. He lay on a straw pallet, a frightful sight in the gloom. His links clashed as he rose at my entry. Our relics in their chests were placed nearby, just out of his impious reach, so that the thighbone of Saint Osbert and the sixth-year molar of Saint Willibald might keep him from bursting his bonds and escaping back to Hell.

Though I would not have been at all sorry had he done so.

I crossed myself and squatted down. His yellow eyes glared at me. I had brought paper, ink, and quills, to exercise what small talent I have for drawing. I sketched a man and said, "*Homo*," for it seemed wiser to teach him Latin than any language confined to a single nation. Then I drew another man and showed him that the two were called *homines*. Thus it went, and he was quick to learn.

Presently he signed for the paper, and I gave it to him. He himself drew skillfully. He told me that his name was *Branithar* and that his race was called *Wersgorix*. I was unable to find these terms in any demonology. But thereafter I let him guide our studies, for his race had made the learning of new languages into a science and our task went apace.

I worked long hours with him, and saw little of the outside world in the next few days. Sir Roger kept his domain incommunicado. I think his greatest fear was that some earl or duke might seize the ship for himself. With his bolder men, the baron spent much time aboard it, trying to fathom all the wonders he encountered.

Erelong Branithar was able to complain about the bread and water diet, and threaten revenge. I was still afraid of him, but kept up a bold front. Of course our conversation was much slower than I here render it, with many pauses while we searched for words.

"You brought this on yourself," I told him. "You should have known better than to make an unprovoked attack on Christians."

"What are Christians?" he asked.

Dumbfounded, I thought he must be feigning ignorance. As a test, I led him through the Pater Noster. He did not go up in smoke, which puzzled me.

"I think I understand," he said. "You refer to some primitive tribal pantheon."

"It is no such heathen thing!" I said indignantly. I started to explain the Trinity to him, but had scarcely gotten to transubstantiation when he waved an impatient blue hand. It was much like a human hand otherwise, save for the thick sharp nails.

"No matter," he said. "Are all Christians as ferocious as your people?"

"You would have had better luck with the French," I admitted. "Your misfortune was landing among Englishmen."

"A stubborn breed," he nodded. "It will cost you dearly. But if you

release me at once, I will try to mitigate the vengeance which is going to fall on you."

My tongue clove to the roof of my mouth, but I unstuck it and asked him coolly enough to elucidate. Whence came he, and what were his intentions?

That took a long time for him to make clear, because the very concepts were strange. I thought surely he was lying, but at least he acquired more Latin in the process.

It was about two weeks after the landing when Sir Owain Montbelle appeared at the abbey and demanded audience with me. I met him in the cloister garden, we found a bench and sat down.

This Owain was the younger son, by a second marriage with a Welsh woman, of a petty baron on the Marches. I daresay the ancient conflict of two nations smoldered strangely in his breast; but the Cymric charm was also there. Made page and later esquire to a great knight in the royal court, young Owain had captured his master's heart and been brought up with all the privilege of far higher ranks. He had traveled widely abroad, become a troubadour of some note, received the accolade—and then suddenly, there he was, penniless. In hopes of winning his fortune, he had wandered to Ansby to join the free companions. Though valiant enough, he was too darkly handsome for most men's taste, and they said no husband felt safe when he was about. This was not quite true, for Sir Roger had taken a fancy to the youth, admired his judgment as well as his education, and was happy that at last Lady Catherine had someone to talk to about the things that most interested her.

"I come from my lord, Brother Parvus," Sir Owain began. "He wishes to know how much longer you will need to tame this beast of ours."

"Oh . . . he speaks glibly enough now," I answered. "But he holds so firmly to out-and-out falsehoods that I have not yet thought it worthwhile to report."

"Sir Roger grows most impatient, and the men can scarcely be held any longer. They devour his substance, and not a night passes without a brawl or a murder. We must start soon or not at all."

"Then I beg you not to go," I said. "Not in yon ship out of Hell." I could see that dizzily tall spire, its nose wreathed with low clouds, rearing beyond the abbey walls. It terrified me.

"Well," snapped Sir Owain, "what has the monster told you?"

"He has the impudence to claim he comes not from below, but from above. From Heaven itself!"

"He . . . an angel?"

"No. He says he is neither angel nor demon, but a member of another mortal race than mankind."

Sir Owain caressed his smooth-shaven chin with one hand. "It could be," he mused. "After all, if Unipeds and Centaurs and other monstrous beings exist, why not those squatty blueskins?"

"I know. 'Twould be reasonable enough save that he claims to live in the sky."

"Tell me just what he did say."

"As you will, Sir Owain, but remember that these impieties are not mine. This Branithar insists that the Earth is not flat, but is a sphere hanging in space. Nay, he goes further and says the Earth moves about the Sun! Some

of the learned ancients held similar notions, but I cannot understand what would keep the oceans from pouring off into space or—"

"Pray continue the story, Brother Parvus."

"Well, Branithar says that the stars are other suns than ours, only very far off, and have worlds going about them even as our own does. Not even the Greeks could have swallowed such an absurdity. What kind of ignorant yokels does the creature take us for? But be this as it may, Branithar says that his people, the Wersgorix, come from one of these worlds, one which is much like our Earth. He boasts of their powers of sorcery—"

"That much is no lie," said Sir Owain. "We've been trying out some of those handweapons. We burned down three houses, a pig, and a serf ere we learned how to control them."

I gulped, but went on: "These Wersgorix have ships which can fly between the stars. They have conquered many worlds. Their method is to subdue or wipe out any backward natives there may be. Then they settle the entire world, each Wersgor taking hundreds of thousands of acres. Their numbers are growing so fast, and they so dislike being crowded, that they must ever be seeking new worlds."

"This ship we captured was a scout, exploring in search of another place to conquer. Having observed our Earth from above, they decided it was suitable for their use and descended. Their plan was the usual one, which had never failed them hitherto. They would terrorize us, use our home as a base, and range about gathering specimens of plants, animals, and minerals. That is the reason their ship is so big, with so much empty space. 'Twas to be a veritable Noah's ark. When they returned home and reported their findings, a fleet would come to attack all mankind."

"Hm-m-m," said Sir Owain. "We stopped that much, at least."

We were both cushioned against the frightful vision of our poor folk being harried by unhumans, destroyed or enslaved, because neither of us really believed it. I had decided that Branithar came from a distant part of the world, perhaps beyond Cathay, and only told these lies in the hope of frightening us into letting him go. Sir Owain agreed with my theory.

"Nonetheless," added the knight, "we must certainly learn to use the ship, lest more of them arrive. And what better way to learn, than by taking it to France and Jerusalem? As my lord said, 'twould in that case be prudent as well as comfortable to have women, children, yeomen, and townfolk along. Have you asked the beast how to cast the spells for working the ship?"

"Yes," I answered reluctantly. "He says the rudder is very simple."

"And have you told him what will happen to him if he does not pilot us faithfully?"

"I have intimated. He says he will obey."

"Good! Then we can start in another day or two!" Sir Owain leaned back, eyes dreamily half closed. "We must eventually see about getting word back to his own people. One could buy much wine and amuse many fair women with his ransom."

III.

And so we departed.

Stranger even than the ship and its advent was that embarkation. There the thing towered, like a steel cliff forged by a wizard for a hideous use. On



the other side of the common huddled little Ansby, thatched cots and rutted streets, fields green beneath our wan English sky. The very castle, once so dominant in the scene, looked shrunken and gray.

But up the ramps we had let down from many levels, into the gleaming pillar, thronged our homely, red-faced, sweating, laughing people. Here John Hameward roared along with his bow across one shoulder and a tavern wench giggling on the other. There a yeoman armed with a rusty ax that might have been swung at Hastings, clad in patched wadmal, preceded a scolding wife burdened with their bedding and cooking-pot, and half a dozen children clinging to her skirts. Here a crossbowman tried to make a stubborn mule climb the gangway, his oaths laying many years in Purgatory to his account. There a lad chased a pig which had gotten loose. Here a richly-clad knight jested with a fine lady who bore a hooded falcon on her wrist. There a priest told his beads as he went doubtfully into the iron maw. Here a cow lowed, there a sheep bleated, here a goat shook its horns, there a hen cackled. All told, some two thousand souls went aboard.

The ship held them easily. Each important man could have a cabin for himself and his lady—for several had brought wives, lemans, or both as far as Ansby Castle, to make a more social occasion of the departure for France. The commoners spread pallets in empty holds. Poor Ansby was left almost deserted, and I often wonder if it still exists.

Sir Roger had made Branithar operate the ship on some trial flights. It had risen smoothly and silently as he worked the wheels and levers and knobs in the control turret. Steering was childishly simple, though we could make neither head nor tail of certain discs with heathenish inscriptions, across which quivered needles. Through me, Branithar told Sir Roger that the ship derived its motive power from the destruction of matter, a horrid idea indeed, and that its engines raised and propelled it by nullifying the pull of the earth along chosen directions. This was senseless—Aristotle has explained very clearly how things fall to the ground because it is their nature to fall, and I have no truck with illogical ideas to which flighty heads so easily succumb.

Despite his own reservations, the abbot joined Father Simon in blessing the ship. We named her *Crusader*. Though we only had two chaplains along, we had also borrowed a lock of Saint Benedict's hair, and all who embarked had confessed and received absolution. So it was thought we were safe enough from ghostly peril, though I had my doubts.

I was given a small cabin adjoining the suite in which Sir Roger lived with his lady and their children. Branithar was kept under guard in a nearby room. My duty was to interpret, to continue the prisoner's instruction in Latin and the education of young Robert, and to act as my lord's amanuensis.

At departure, however, the control turret was occupied by Sir Roger, Sir Owain, Branithar, and myself. It was windowless, like the entire ship, but held glassy screens in which appeared images of the Earth below and all the sky around. I shivered and told my beads, for it is not lawful for Christian men to gaze into the crystal globes of Indic sorcerers.

"Now, then," said Sir Roger, and his hooked face laughed at me, "let's away! We'll be in France within the hour!"

He sat down before the panel of levers and wheels. Branithar said quickly to me: "The trial flights were only a few miles. Tell your master that for a trip this length, certain special preparations must be made."

Sir Roger nodded when I had passed this on. "Very well, let him do so." His sword slithered from the sheath. "But I'll be watching our course in the screens. At the first sign of treachery—"

Sir Owain scowled. "Is this wise, my lord?" he asked. "The beast—"

"Is our prisoner. You're too full of Celtic superstitions, Owain. Let him begin."

Branithar seated himself. The furnishings of the ship, chairs and tables and beds and cabinets, were somewhat small for us humans—and badly designed, without so much as a carved dragon for ornament. But we could make do with them. I watched the captive intently as his blue hands moved over the panel.

A deep humming trembled in the ship. I felt nothing, but the ground in the lower screens suddenly dwindled. That was sorcerous; I would much rather the usual backward thrust of a vehicle when it starts were not annulled. Fighting down my stomach, I stared into the screen-reflected vault of Heaven. Erelong we were among the clouds, which proved to be high-floating mists. Clearly this shows the wondrous power of God, for it is known that the angels often sit about on the clouds, and do not get wet.

"Now, southward," ordered Sir Roger.

Branithar grunted, set a dial, and snapped down a bar. I heard a clicking as of a lock. The bar stayed down.

Hellish triumph flared in the yellow eyes. Branithar sprang from his seat and snarled at me: "*Consummati estis!*" His Latin was very bad. "You are finished! I have just sent you to death!"

"What?" I cried.

Sir Roger cursed, half understanding, and lunged at the Wersgor. But the sight of what was in the screens checked him. The sword clattered from his hand, and sweat leaped out on his face.

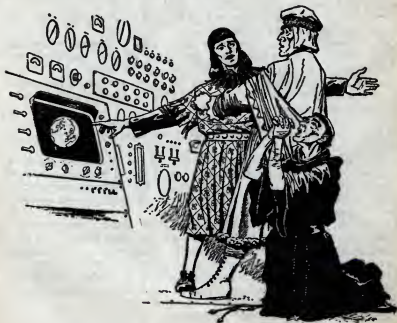
Truly it was terrible. The earth dwindled beneath us as if it were falling down a great well. About us, the blue sky darkened, and stars glittered forth. Yet it was not nightfall, for the sun still shone in one screen, more brightly than ever!

Sir Owain screamed something in Welsh. I fell to my knees.

Branithar darted for the door. Sir Roger whirled and grasped him by the robe he wore. They went over in a raging tangle.

Sir Owain was paralyzed by terror, and I could not pull my eyes from the horrible beauty of the spectacle about us. Earth shrank so small that it only filled one screen. It was blue, banded with dark splotches, and round. Round!

A new and deeper note entered the low drone in the air. New needles on the control panel quivered to life. Suddenly we were moving, gaining speed, with impossible swiftness. An altogether different set of engines, acting on a wholly unknown principle, had unwound their ropes.



I saw the moon swell before us. Even as I stared, we passed so near that I could see mountains and pockmarks upon it, edged with their own shadows. But this was inconceivable! All knew the moon to be a perfect circle. Sobbing, I tried to break that liar of a vision screen, but could not.

Sir Roger overcame Branithar and stretched him half-conscious on the deck. The knight got up, breathing heavily. "Where are we?" he gasped. "What's happened?"

"We're going up," I groaned. "Up and out." I put my fingers in my ears so as not to be deafened when we crashed into the first of the crystal spheres.

After a while, when nothing had occurred, I opened my eyes and looked again. Earth and moon were both receding, little more than a doubled star of blue and gold. The real stars flamed hard, unwinking, against an infinite blackness. It seemed to me that we were still picking up speed.

Sir Roger cut off my prayers with an oath. "We've this traitor to handle first!" He kicked Branithar in the ribs. The Wersgor sat up and glared defiance.

I collected my wits and said to him in Latin, "What have you done? You will die by torture unless you take us back at once."

He rose, folded his arms, and regarded us with bitter pride. "Did you think that you barbarians were any match for a civilized mind?" he answered. "Do what you will with me. There will be revenge enough when you come to this journey's end."

"But what *have* you done?"

His bruised mouth grinned. "I set the ship under control of its automaton-pilot. It is now steering itself. Everything is automatic—the departure from atmosphere, the switchover into translight quasivelocity, the compensation for optical effects, the preservation of artificial gravity and other environmental factors."

"Well, turn off the engines!"

"No one can. I could not do so myself, now that the lock-bar is down. It will remain down until we get to Tharixan. And that is the nearest world settled by my people!"

I tried the controls, gingerly. They could not be moved. When I told the knights, Sir Owain moaned aloud. But Sir Roger said grimly:

"We'll find whether that is the truth or not. The questioning will at least punish his betrayal!"

Through me, Branithar replied with scorn: "Vent your spite if you must. I am not afraid of you. But I say that even if you broke my will, it would be useless. The rudder settings cannot be changed now, nor the ship halted. The lock-bar is meant for situations when a vessel must be sent somewhere with no one aboard." After a moment he added earnestly: "You must understand, though, I bear you no malice. You are foolhardy, but I could almost regret the fact that we need your world for ourselves. If you will spare me, I shall intercede for you when we get to Tharixan. Your own lives may be given you, at least."

Sir Roger rubbed his chin thoughtfully. I heard the bristles scratch under his palm, though he had shaved only last Thursday. "I gather the ship will become manageable again when we reach this destination," he said. I was

amazed how coolly he took it after the first shock. "Could we not turn about then and go home?"

"I will never guide you!" said Branithar to that. "And alone, unable to read our navigational books, you would never find the way. We will be farther from your world than light can travel in a thousand of your years."

"You might have the courtesy not to insult our intelligence," I huffed. "I know as well as you do that light has an infinite velocity."

He shrugged.

A gleam lit Sir Roger's eye. "When will we arrive?" he asked.

"In ten days," Branithar informed us. "It is not the distances between stars, great though they are, that has made us so slow to reach your world. We have been expanding for three centuries. It is the sheer number of suns."

"Hm-m-m. When we arrive, we have this fine ship to use, with its bombards and the handweapons. The Wersgorix may regret our visit!"

I translated for Branithar, who answered, "I sincerely advise you to surrender at once. True, these fire beams of ours can slay a man, or reduce a city to slag. But you will find them useless, because we have screens of pure force which will stop any such beam. The ship is not so protected, since the generators of a force shield are too bulky for it. Thus the guns of the fortress can shoot upward and destroy you."

When Sir Roger heard this, he said only: "Well, we've ten days to think it over. Let this remain a secret. No one can see out of the ship, save from this place. I'll think of some tale that won't alarm the folk too much."

He went out, his cloak swirling behind him like great wings.

IV.

I was the least of our troop, and much happened in which I had no part. Yet I shall set it down as fully as may be, using conjecture to fill in the gaps of knowledge. The chaplains heard much in confession, and without violating confidence, they were ever quick to correct false impressions.

I believe, therefore, that Sir Roger took Catherine his lady aside and told her how matters stood. He had hoped for calm and courage from her, but she remained stock-still a moment, regarding him. Then she whispered, almost in unbelief: "But you are *smiling*!"

He threw back his head to laugh aloud. "And why not? True, this turn was unforeseen—it raises great dangers—but what an enterprise! What a chance! We'll make Huon of Bordeaux himself look like a crone huddled in her ingenook!"

"If God Himself commanded us to this . . . perhaps then you were right to joy in it—but, but as 'tis . . ." Her voice died away in horror.

Exalted by his boundless visions, and by her, who was the very crown of his world, Sir Roger cried, "Nay, not God. Myself. I want to go on this venturing; is that not reason enough to do it?"

Her lovely face turned red and then white, and she stamped a small foot on the steel deck. "Ill was the day I wed you!" Rage burst bitterly from her. "Hard enough that your oafishness should disgrace me before king and court, and doom me to yawn my life away in that bear's den you call a castle. Now you set the lives and the very souls of my children at hazard!"

"But, dearest," he stammered, taken aback. "I thought . . . I could not know—"

"Nay, you were too stupid! Your arrogance told you the demon was so afraid of you he would be your obedient slave. And now you cannot even admit how he tricked and doomed you. Mary, Pity women!"

She whirled, sobbing, and hurried from him.

Sir Roger stared after her till she had vanished down the long corridor. Then, heavy-hearted, he betook himself to see his troopers.

He found them in the after hold, cooking their supper. The air remained sweet in spite of all the fires we lit; Branithar told me the ship embodied a system for renewing the vital spirits of the atmosphere. I found it somewhat unnerving always to have the walls luminous and not know day from night. But the common soldiers sat around, hoisting ale crocks, bragging, dicing, cracking fleas, a wild godless crew who nonetheless cheered their lord with real affection.

Sir Roger signaled to Red John Hameward, whose huge form lumbered to join him in a small side chamber. "Well, sire," he remarked, "it seems a longish ways to France after all."

"Plans have been . . . changed," Sir Roger told him carefully. "It seems there may be a rare booty in the homeland of this ship. With that, we could equip an army large enough not only to take, but to hold and settle all our conquests."

Red John belched and scratched under his doublet. "If we don't run into more nor we can handle, sire."

"I think not. But you must prepare your men for this change of plan, and soothe whatever fears they have."

"That'll not be easy, sire."

"Why not? I told you the plunder would be good."

"Well, my lord, if you want the truth, 'tis in this wise. You see, though we've most of the Ansby women along, and many of 'em are unwed and, um, friendly disposed . . . even so, my lord, the fact remains, d' you see, we've twice as many men as women. Now the French girls are fair, and belike the Saracen wenches would do in a pinch—indeed, they're said to be very pinchable—but judging from those blueskins we overmastered, well, their females aren't so handsome."

"How do you know they don't hold beautiful princesses in captivity that yearn for an honest English face?"

"That's so, my lord. It could well be."

"Then sec you have the bowmen ready to fight when we arrive." Sir Roger clapped the giant on the shoulder and went out to speak similarly with his other captains.

He mentioned this question of women to me somewhat late and I was horrified. "God be praised, that He made the Wersgor so unattractive, if they are of another species!" I exclaimed. "Great is His forethought!"

"Ill-favored though they be," asked the baron, "are you sure they're not human?"

"Would God I knew, sire," I answered after thinking about it. "They look like naught on Earth. Yet they do go on two legs, have hands, speech, the power of reason."

"It matters little," he decided.

"Oh, but it matters greatly, sire!" I told him. "For see you, if they have souls, then it is our plain duty to win them to the Faith. But if they have not, it were blasphemous to give them the sacraments."

"I'll let you find out which," he said indifferently.

I hurried forthwith to Branithar's cabin, which was guarded by a couple of spearman. "What would you?" he asked when I sat down.

"Have you a soul?" I inquired.

"A what?"

I explained what *spiritus* meant. He was still puzzled. "Do you really think a minature of yourself lives in your head?" he asked.

"Oh, no. The soul is not material. It is what gives life . . . well, not exactly that, since animals are alive . . . will, the self—"

"I see. The brain."

"No, no, no! The soul is, well, that which lives on after the body is dead, and faces judgment for its actions during life."

"Ah. You believe, then, that the personality survives after death. An interesting problem. If personality is a pattern rather than a material object, as seems reasonable, then it is theoretically possible that this pattern may be transferred to something else, the same system of relationships but in another physical matrix."

"Stop maundering!" I snapped impatiently. "You are worse than an Albigensian. Tell me in plain words, do you or do you not have a soul?"

"Our scientists have investigated the problems involved in a pattern concept of personality, but so far as I know, data are still lacking on which to base a conclusion."

"There you go again," I sighed. "Can you not give me a simple answer? Just tell me whether or not you have a soul."

"I don't know."

"You're no help at all," I scolded him, and left.

My colleagues and I debated the problem at length, but except for the obvious fact that provisional baptism could be given any nonhumans willing to receive it, no solution was reached. It was a matter for Rome, perhaps for an ecumenical council.

While all this went on, Lady Catherine had mastered her tears and swept haughtily on down a passageway, seeking to ease her inner turmoil by motion. In the long room where the captains dined, she found Sir Owain tuning his harp. He leaped to his feet and bowed. "My lady! This is a pleasant . . . I might say dazzling . . . surprise."

She sat down on a bench. "Where are we now?" she asked in sudden surrender to her weariness.

Perceiving that she knew the truth, he replied, "I don't know. Already the sun itself has shrunk till we have lost view of it among the stars." A slow smile kindled in his dark face. "Yet there is sun enough in this chamber."

Catherine felt a blush go up her cheeks. She looked down at her shoes. Her own lips stirred upward, unwilling by herself.

"We are on the loneliest voyage men ever undertook," said Sir Owain. "If my lady will permit, I'll seek to while away an hour of it with a song cycle dedicated to her charms."

She did not refuse more than once. His voice rose until it filled the room.

V.

There is little to tell of the outward journey. The tedium of it soon bulked larger than the perils. Knights exchanged harsh words, and John Hameward had to crack more than one pair of heads together to keep order among his bowmen. The serfs took it best; when not caring for livestock, or eating, they merely slept.

I noticed that Lady Catherine was often at converse with Sir Owain, and that her husband was no longer overjoyed about it. However, he was always caught up in some plan or preparation, and the younger knight did give her hours of distraction—even of merriment.

Roger and I spent much time with Branithar, who was willing enough to tell us about his race and its empire. I was reluctantly coming to believe his claims. Strange that so ugly a breed should dwell in what I judged to be the Third Heaven, but the fact could not be denied. Belike, I thought, when Scripture mentioned the four corners of the world, it did not mean our planet Terra at all, but referred to a cubical universe. Beyond this must lie the abode of the blessed; while Branithar's remark about the molten interior of the earth was certainly consonant with prophetic visions of Hell.

Branithar told us that there were about a hundred worlds like our own in the Wersgor empire. They circled as many separate stars, for no sun was likely to have more than one habitable planet. Each of these worlds was the dwelling place of a few million Wersgorix, who liked plenty of room. Except for the capital planet, Wersgorixan, they bore no cities. But those on the frontiers of the empire, like the Tharixan whither we were bound, had fortresses which were also space-navy bases. Branithar stressed the firepower and impregnability of these castles.

If a usable planet had intelligent natives, these were either exterminated or enslaved. The Wersgorix did no menial work, leaving this to such helots, or to automata. Themselves they were soldiers, managers of their vast estates, traders, owners of manufactories, politicians, courtiers. Being unarmed, the enslaved natives had no hope of revolting against the relatively small number of alien masters. Sir Roger muttered something about distributing weapons to these oppressed beings when we arrived and telling them about the Jacquerie. But Branithar guessed his intent, laughed, and said Tharixan had never been inhabited, so there were only a few hundred slaves on the entire planet.

This empire filled a rough sphere in space, about two thousand light-years across. (A light-year being the incredible distance that light covers in one standard Wersgor year, which Branithar said was about ten per cent longer than the Terrestrial period.) It included millions of suns with their worlds. But most of these, because of poisonous air or poisonous life forms or other things, were useless to the Wersgorix and ignored.

Sir Roger asked if they were the only nation which had learned to fly between the stars. Branithar shrugged contemptuously. "We have encountered three others, who developed the art independently," he said. "They live within the sphere of our empire, but so far we have not subdued them. It was not worthwhile, when primitive planets are such easier game. We allow these three races to traffic, and to keep the small number of colonies they had already established in other planetary systems. But we have not allowed

them to continue expanding. A couple of minor wars settled that. They have no love for us, they know we will destroy them some day when it is convenient for us to do so, but they are helpless in the face of overwhelming power."

"I see," nodded the baron.

He instructed me to start learning the Wersgor language. Branithar found it amusing to teach me, and I could smother my own fears by hard work, so it went quite fast. Their tongue was barbarous, lacking the noble inflections of Latin, but on that account not hard to master.

In the control turret I found drawers full of charts and numerical tables. All the writing was beautifully exact; I thought they must have such scribes it was a pity they had not gone on to illuminate the pages. Puzzling over these, and using what I had learned of the Wersgor speech and alphabet, I decided this was a set of navigational directions.

A regular map of the planet Tharixan was included, since this had been the home base of the expedition. I translated the symbols for land, sea, river, fortress, and so on. Sir Roger pored long hours over it. Even the Saracen chart his grandfather had brought back from the Holy Land was crude compared to this; though on the other hand the Wersgorix showed lack of culture by omitting pictures of mermaids, the four winds, hippogriffs, and similar ornamentation.

I also deciphered the legends on some of the control-panel instruments. Such dials as those for altitude and speed could readily be mastered. But what did "fuel flow" mean? What was the difference between "sub-light drive" and "super-light drive"? Truly these were potent, though pagan, charms.

And so the sameness of days passed, and after a time which felt like a century we observed that one star was waxing in the screens. It swelled, until it flamed big and bright as our own sun. And then we saw a planet, similar to ours save that it had two small moons. Downward we plunged, till the scene was not a ball in the sky but a great rugged sweep of landscape under our footsoles. When I saw heaven again turned blue, I threw myself to the deck in thanksgiving.

The lock-bar snapped upward. The ship came to a halt and hung where it was, a mile in the air. We had reached Tharixan.

VI.

Sir Roger had summoned me to the control turret, with Sir Owain and Red John, who led Branithar on a leash. The bowman gaped at the screens and muttered horrid oaths.

Word had gone through the ship that all fighting men must arm themselves. The two knights here were in plate, their esquires waiting outside with shields and helmets. Horses stamped in the holds and along the corridors. Women and children huddled back with bright fearful eyes.

"Here we are!" Sir Roger grinned. It was eldritch to see him so boyishly gay, when everyone else was swallowing hard and sweating till the air reeked. But a fight, even against the powers of Hell, was something he could understand. "Brother Parvus, ask the prisoner where we are on the planet."

I put the question to Branithar, who touched a control button. A hitherto blank screen glowed to life, showing a map. "We are where the cross-hairs center," he told us. "The map will unroll as we fly about."

I compared the screen with the chart in my hand. "The fortress called Ganturath seems to lie about a hundred miles north by northeast, my lord," I said.

Branithar, who had been picking up a little English, nodded. "Ganturath is only a minor base." He must put his boasts into Latin still. "Yet numerous spaceships are stationed there, and swarms of aircraft. The fire-weapons on the ground can blast this vessel out of existence, and force screens will stop any beams from your own guns. Best you surrender."

When I had translated, Sir Owain said slowly: "It may be the wisest thing, my lord."

"What?" cried Sir Roger. "An Englishman yield without a fight?"

"But the women, sire, and the poor little children!"

"I am not a rich man," said Sir Roger. "I cannot afford to pay ransom." He clumped in his armor to the pilot's chair, sat down, and tapped the manual controls.

Through the downward vision screens, I saw the land slide swiftly away beneath us. Its rivers and mountains were of homelike shape, but the vegetation's green hues were overlaid with a weird bluish tint. The country seemed wild. Now and again we saw a few rounded buildings, amidst enormous grainfields cultivated by machines, but otherwise it was bare of man as the New Forest. I wondered if this, too, were some king's hunting preserve, then remembered Branithar's account of sparse habitation everywhere in the Wersgor Empire.

A voice broke our silence, chattering away in the harsh blueface language. We started, crossed ourselves, and glared about. The sounds came from a small black instrument affixed to the main panel.

"So!" Red John drew his dagger. "All this time there's been a stowaway! Give me a crowbar, sire, and I'll pry him out."

Branithar divined his meaning. Laughter barked in the thick blue throat. "The voice is borne from afar, by waves like those of light but longer," he said.

"Talk sense!" I demanded.

"Well, we are being hailed by an observer at Ganturath fortress."

Sir Roger nodded curtly when I translated. "Voices out of thin air are little compared to what we've already seen," he said. "What does the fellow want?"

I could catch only a few words of the challenge, but got the drift of it. Who were we? This was not the regular landing place for scout craft. Why did we enter a forbidden area? "Calm them," I instructed Branithar, "and remember I will understand if you betray us."

He shrugged, as if amused, though his own brow was also filmed with sweat. "Scoutship 587-Zin returning," he said. "Urgent message. Will halt above the base."

The voice gave assent, but warned that if we came lower than a *stanthax*—about half a mile—we would be destroyed. We were to hover until the crews of patrol aircraft could board us.

By now, Ganturath was visible: a compact mass of domes and half-cylinders, masonry over steel skeletons as we later found out. It made a circle about a thousand feet in diameter. Half a mile or so northward lay a smaller set of buildings. Through a magnifying view screen, we saw that out of the latter jutted the muzzles of a number of huge fire-bombards.

Even as we came to a halt, a pale shimmering sprang up around both parts of the fortress. Branithar pointed. "The defensive screens. Your own shots would spatter harmlessly off. It would be a lucky hit that melted one of those gun muzzles, where they thrust out beyond the shield. But you are an easy target."

Several egg-shaped metallic craft, like midges against the huge bulk of our *Crusader*, approached. We saw others lift from the ground, the main part of the fortress. Sir Roger's fair head nodded. "'Tis as I thought," he said. "Those screens stop a fire-beam, mayhap, but not a material object, since the boats pass through."

"True," said Branithar by way of me. "You might manage to drop an explosive missile or two, but the outlying section, where the guns are, would destroy you."

"Ah-ha." Sir Roger studied the Wersgor with eyes gone pale. "So you possess explosive shells, eh? Doubtless aboard this very craft. And you never told me. We'll see about that later." He jerked a thumb at Red John and Sir Owain. "Well, you two have seen how the ground lies. Go back to the men, now, and be ready to emerge fighting when we land."

They departed, nervously eyeing the screens, where the aircraft were very near us. Sir Roger put his own hands on the wheels that controlled the bombards. We had learned, with some experimentation, that those great weapons almost aimed and fired themselves. As the patrol boats closed in Sir Roger cut loose.

Blinding hell-beams stabbed forth. They wrapped the aircraft in flame. I saw the nearest one cut in two by that fiery sword. Another tumbled red-hot, a third exploded. Thunder boomed. Then all I saw was falling metal scrap.

Sir Roger tested Branithar's claims, but they were true: his beams splashed off that pale, translucent screen. He grunted. "I looked for that. Best we get down now before they send up a real warship to deal with us, or open fire from the outlying emplacement." While he spoke, he sent us hurtling groundward. A flame touched our hull, but then we were too low. I saw Ganturath's buildings rush up to meet me, and braced myself for death.

A ripping and crunching went through our ship. This very turret burst open as it brushed a low lookout tower. But the battlements of that were snapped off. Two thousand feet long, incalculably heavy, the *Crusader* squashed half Ganturath beneath itself.

Sir Roger was on his feet even before the engines went dead. "Haro!" he bellowed. "God send the right!" And off he went, across the canted, buckled deck. He snatched his helmet from the terrified esquire and put it on as he strode. The boy followed, teeth chattering but nonetheless in charge of the de Tourneville shield.

Branithar sat speechless. I gathered up my robe and hurried off to find a sergeant who would lock up the valuable captive for me. This being done, I was able to witness the battle.

We had come down lengthwise rather than on our tail, protected by

the artificial weight generators from tumbling around inside. Havoc encompassed us, smashed buildings and sharded walls. A chaos of blue Wersgorix boiled from the rest of the fortress.

By the time I got to the exit myself, Sir Roger was out with all his cavalry. He didn't stop to gather them, but charged into the thick of the nearest enemies. His horse neighed, mane flying, armor flashing, the long lance spitted three bodies at once. When at length the spear was broken, my lord drew his sword and hewed lustily. Most of his followers had no scruples about unknighly weapons; they eked out blade, mace, and morningstar with handguns from the ship.

Now archers and men-at-arms poured forth, yelling. Belike it was their own terror that made them so savage. They closed with the Wersgorix ere our foe could unleash many lightning bolts. The battle became hand-to-hand, a leaderless riot, where ax or dagger or quarterstaff was more useful than fire-beam or pellet-gun.

When the space about him was cleared, Sir Roger reared in his black stallion. He clashed back his visor and set bugle to lips. It shrieked through the din, summoning the mounted force. These, better disciplined than the foot soldiers, disengaged themselves from the immediate fray and joined the baron. A mass of great horses, men like steel towers, blazoned shields and flying plumes and lances aloft, formed behind my lord.

His gauntleted hand pointed to the outlying fort, where the skyward bombard had ceased their futile shooting. "That we must seize, ere they rally!" he cried. "After me, Englishmen, for God and St. George!"

He took a fresh shaft from his esquire, spurred his charger, and began to pick up speed. The earthquake roll of hoofs deepened behind him.

Those Wersgorix stationed in the lesser fort poured out to resist the attack. They had guns of several kinds, plus small explosive missiles to be thrown by hand. They picked off a couple of riders. But in that short distance there was no time for more long-range shooting. And they were unnerved in any event. There is no sight more terrifying than a charge of heavy cavalry.

The trouble of the Wersgorix was that they had gone too far. They had made combat on the ground obsolete, and were ill-trained, ill-equipped, when it happened. True, they possessed fire-beams, as well as force shields to stop those same fire-beams. But they had never thought to lay down caltrops or chevaux-de-frise.

As it was, the frightful blow struck their line, rolled over it, stamped it into mud, and continued without even being slowed.

One of the buildings beyond gaped open. A small spaceship—though big as any sea-going vessel on Earth—had been trundled forth. It stood on its tail, engine growling, ready to take off and flame us from above. Sir Roger directed his cavalry thither. The lancers hit it in a single line. Shafts splintered; men were hurled from the saddle. But consider: a charging cavalryman may bear his own weight of armor, and have fifteen hundred pounds of horse beneath him. The whole travels at several miles per hour. The impact is awesome.

The ship was bowled over. It fell on its side and lay crippled.

Through and through the lesser fort, Sir Roger's horsemen ramped, sword, mace, spurred boot and shod hoof. The Wersgorix died like swatted

flies. Or say rather, the flies were the small patrol boats, buzzing overhead, unable to shoot into that melee without killing their own folk. To be sure, Sir Roger was killing their own folk anyway; but by the time the Wersgorix realized that, they were too late.

Back in the main section where the *Crusader* lay, the fight sputtered down into a question of slaying bluefaces, or taking them prisoner, or chasing them into the nearby forest. It was still one vast confusion, though, and Red John Hameward felt he was wasting the skill of his longbowmen. He formed them into a detachment and quick-stepped across open ground to aid Sir Roger.

The patrol boats swooped low hungrily. Here was prey they might get. Their thin beams were intended for short ranges. On the first pass, two archers died. Then Red John yelled an order.

Suddenly the sky was full of arrows. A clothyard shaft with a six-foot yew bow behind it will go through an armored man and the horse beneath him. These little boats made matters worse by flying directly into the gray goose flock. Not one of them escaped. Riddled, their pilots quilled as hedgehogs, they crashed. The archers roared and ran to join the fray ahead.

The spaceship which the lancers had knocked over was still manned. Its crew must have recovered their wits. Suddenly its gun turrets spurted flame, no mere handweapon beam but thunderbolts that knocked down walls.



A horseman and his steed, caught in that fire, were instantly gone. Vengefully, the lightnings raged around.

Red John picked up one end of a great steel beam, part of the dome shattered by those bombards. Fifty men aided him. They ran toward the entry port of the ship. Once, twice, crash! Down came the door, and the English yeomen stormed within.

The Battle of Ganturath lasted for some hours, but most of that time went merely to ferret out hidden remnants of the garrison. When the alien sun smoldered westward, there were about a score of English dead. None were badly wounded, for the flame guns usually killed if they hit the mark at all. Some three hundred Wersgorix were slain, roughly an equal number captured: many of these latter were minus a limb or an ear. I would guess that perhaps a hundred more escaped on foot. They would carry word of us to the nearest estates—which, however, were not very close by. Evidently the speed and destructiveness of our initial attack had put Ganturath's far-speakers out of action before the alarm could go abroad.

Our true disaster was not revealed till later. We were not dismayed at having wrecked the ship we came in, for we now had several other vessels whose aggregate volume would hold us all. Their crews had never gotten a chance to man them. However, in her atrocious landing, the *Crusader* had burst open her control turret. And the Wersgor navigational notes therein were now lost.

At the moment, all was triumph. Red-splashed, panting, in scorched and dented armor, Sir Roger de Tourneville rode a weary horse back to the main fortress. After him came the lancers, archers, yeomen—ragged, battered, shoulders slumped with exhaustion. But the *Te Deum* was on their lips, rising beneath the strange constellations that twinkled forth, and their banners flew bravely against the sky.

It was wonderful to be an Englishman.

VII.

We made camp at the nearly intact lesser fort. Our people chopped wood from the forest, and as the two moons rose, their blazes leaped up. Men sat close, faces picked out of darkness by the homely unrestful light, waiting for the stewpots to be ready. Horses cropped the native grass without enjoying its taste. The captured Wersgorix huddled together under a guard of pikemen. They were stunned; this did not seem possible. I felt almost sorry for them, godless and cruel though their dominion was.

Sir Roger summoned me to join his captains, who were camped near one of the gun turrets. We manned what defenses were available, against expected counterattack, and tried not to wonder what new frightfulness the foe might have in their armory.

Tents had been erected for the more well-born ladies. Most were abed, but Lady Catherine sat on a stool at the edge of the firelight. She listened to our talk, and her mouth was drawn into bleak lines.

The captains sprawled weary on the ground. I saw Sir Owain Montbelle, idly thrumming his harp; scarred, fierce old Sir Brian Fitz-William, the third

of the three knighted men on this voyage; big Alfred Edgarson, the purest of Saxon franklins; gloomy Thomas Bullard, fingering the naked sword on his lap; Red John Hameward, shy because he was the lowest born of them all. A couple of pages poured wine.

My lord Sir Roger, the unbendable, was on his feet, hands clasped behind his back. Having removed his armor like the others, while leaving his clothes of pride in their chest, he might have been the humblest of his own sergeants. But then one saw the sinewy jut-nosed face, and heard him talk. And spurs jingled on his boots.

He nodded as I came into view. "Ah, there, Brother Parvus. Sit down and have a stoup. You've a head on your chine, and we need all good reds tonight."

A while longer he paced, brooding. I dared not interrupt with my own dreadful news. A medley of noises in the dark deepened its twin-mooned otherness. These were not the frogs and crickets and nightjars of England: here was a buzz, a saw-toothed hum, an inhumanly sweet singing like a lute of steel. And the odors were alien too, which disturbed me even more.

"Well," said my lord. "By God's grace, we've won this first encounter. Now we must decide what to do next."

"I think—" Sir Owain cleared his throat, then spoke hurriedly: "No, gentles, I am sure. God aided us against unforeseeable treachery. He will not be with us if we show undue pride. We've won a rare booty of weapons, with which we can accomplish great things at home. Let us therefore start back at once."

Sir Roger tugged his chin. "I'd liefer stay here," he answered, "yet there's much in what you say, my friend. We can always come back after the Holy Land is freed, and do a proper job on this fiend's nest."

"Aye," nodded Sir Brian. "We're too alone now, and encumbered with women and children and aged and livestock. So few fighting men against a whole empire, that were madness."

"Yet I could like to break another spear against these Wersgorix," said Alfred Edgarson. "I haven't won any gold here yet."

"Gold is no use unless we bring it home," Captain Bullard reminded him. "Bad enough campaigning in the heat and thirst of the Holy Land. Here, we know not even what plants may be poisonous, or what the winter season is like. Best we depart tomorrow."

A rumble of assent went up among them.

I cleared my throat miserably. Branithar and I had just spent a most unpleasant hour. "My lords—" I began.

"Yes? What is it?" Sir Roger fairly glared at me.

"My lords, I do not think we can find the way home!"

"What?" They roared it out. Several leaped to their feet. I heard Lady Catherine suck a horrified breath in between her teeth.

Then I explained that the Wersgor notes on the route to our sun were missing from the shattered control turret. I had led a search party, scratching about everywhere in the attempt to find them, but had no success. The interior of the turret was blackened, melted in places. I could only conclude that a stray firebeam had come through the hole, played across a drawer burst open by the violence of our landing, and cindered the papers.

"But Branithar knows the way!" protested Red John. "He sailed it himself! I'll wring it out of him, my lord."

"Be not so hasty," I counselled. "'Tis not like sailing along a coastline, where every landmark is known. There are uncounted millions of stars. This scouting expedition zigzagged among them looking for a suitable planet. Without the figures which the captain wrote down as they sailed, one might spend a lifetime in search and not happen on our own sun."

"But doesn't Branithar remember?" yelled Sir Owain.

"Remember a hundred pages of numbers?" I responded. "Nay, none could do that, and this is the more true since Branithar was not the captain of the ship nor the one who kept track of her wanderings and heaved the log and performed other navigational duties, rather our captive was a lesser noble whose task was more among the crewmen and in working with the demonic engines than—"

"Enough," Sir Roger gnawed his lip and stared at the ground. "This changes things. Yes— Was not the *Crusader's* route known in advance? Say by the duke who sent her out?"

"No, my lord," I said. "Wersgor scoutships merely go off in any direction the captain likes and look at any star he deems promising. Not till they come back and report does their duke know where they have been."

A groan went up. Those were hardy men, but this was enough to daunt the Nine Worthies, Sir Roger walked stiffly over to his wife and laid a hand on her arm.

"I'm sorry, my dear," he mumbled.

She turned her face from him.

Sir Owain arose. The knuckles stood forth pale on the hand that clutched his harp. "This have you led us to!" he shrieked. "To death and damnation beyond the sky! Are you satisfied?"

Sir Roger clapped hand on hilt. "Be still!" he roared. "All of you agreed with my plan. Not a one of you demurred. None were forced to come. We must all share the burden now, or God pity us!"

The younger knight muttered rebelliously, but sat down again.

It was awesome how swiftly my lord rebounded from dismay to boldness. What began as a mask put on for the others' benefit became, within seconds, his own true mood. Indeed he was a peerless leader. I attribute it to the blood of King William the Conqueror, a bastard grandson of whom wed an illegitimate daughter of that Earl Godfrey who was later outlawed for piracy, and so founded the noble de Tourneville house.

"Come, now," said the baron with steadily rising cheerfulness. "'Tis not so bad. We've but to act with steadfast hearts, and the day shall yet be ours. Remember, we hold a good number of captives, whom we can use as a bargaining point. If we must fight again, we've already proven they cannot withstand us under anything like equal conditions. I admit there are more of them, and that they have more skill with these craven hell-weapons. But what of that? 'Twill not be the first time brave men properly led have driven a seemingly stronger army from the field.

"At the very worst, we can retreat. We have sky ships enough, and can evade pursuit in the trackless deeps of space. But I'm fain to stay here, bargain shrewdly, fight where needful, and put my trust in God. Surely He, Who stopped the sun for Joshua, can swat a million Wersgorix if it

pleases Him: for His mercy endureth forever. After we've wrung terms from the foe, we'll make them find our home for us, and stuff our ships with gold. I say to you, hold fast! For the glory of God, the honor of England, and the enrichment of us all!"

He caught them up, bore them on the wave of his own spirit, and had them cheering him at the end. They crowded close, hands on his hands above his great shining sword, and swore to remain true till the danger was past. Thereafter an hour went in eager planning—most of it, alas wasted, for God seldom brings that to pass which man expects. Finally all went to their rest.

I saw my lord take his wife's arm to lead her into his pavilion. She spoke to him, a harsh whisper, she would not hear his protests but stood there denouncing him in the enemy night. The larger moon, already sinking, touched them with cold fire.

Sir Roger's shoulders slumped. He turned and went slowly from her, wrapped himself in a saddle blanket and slept in the dews of the field.

It was strange that a man among men was so helpless against a woman. He had something beaten and pitiful about him as he lay there. I thought it boded ill for us.

VIII.

We had been too excited at first to pay attention, and afterward we slept too long. But when I woke again, finding it still dark, I checked the movement of stars against trees. Ah, how slowly! The night here was many times as long as on Earth.

This unnerved our folk badly enough in itself. The fact that we did not flee—by now, it could no longer be concealed that treason, rather than desire, had brought us hither—puzzled many. But at least they expected weeks to carry out whatever the baron decided.

The shock, when enemy ships appeared even before dawn, was great.

"Be of good heart," I counselled Red John, as he shivered with his bowmen in the gray mists. "'Tis not that they have powers magical. You were warned of this at the captains' council. 'Tis only that they can talk across hundreds of miles and fly such distances in minutes. So as soon as one of the fugitives reached another estate, the word of us went abroad."

"Well," said Red John, not unreasonably, "if that's not magic, I'd like to know what is."

"If magic, you need have no fear," I answered, "for the black arts do not prevail against good Christian men. However, I tell you again, this is mere skill in the mechanic and warlike arts."

"And those do prevail against g-g-good Christian men!" blubbered an archer. John cuffed him to silence, while I cursed my own clumsy tongue.

In that wan tricky light, we could see many ships hovering, some of them as big as our broken *Crusader*. My knees drummed under my cassock. Of course, we were all inside the force screen of the smaller fort, which had never been turned off. Our gunners had already discovered that the fire-bombards placed here had controls as simple as any in the spaceship, and stood prepared to shoot. However, I knew we had no true defense. One

of those very powerful explosive shells whereof I had heard hints, could be fired. Or the Wersgorix might attack on foot, overwhelming us with sheer numbers.

Yet those ships did only hover, in utter silence under the unknown stars. When at length the first pale dawnlight streamed off their flanks, I left the bowmen and fumbled through dew-wet grass to the cavalry. Sir Roger sat peering heavenward from his saddle. He was armed cap-a-pie, helmet in the crook of an arm, and none could tell from his face how little sleep had been granted him.

"Good morning, Brother Parvus," he said. "That was a long darkness."

Sir Owain, mounted close by, wet his lips. He was pale, his large long-lashed eyes sunken in dark rims. "No midwinter night in England ever wore away so slowly," he said, and crossed himself.

"The more daylight, then," said Sir Roger. He seemed almost cheerful, now when he dealt with foemen rather than unruly womenfolk.

Sir Owain's voice cracked across like a dry twig. "Why don't they attack?" he yelled. "Why do they just wait up there?"

"It should be obvious. I never thought 'twould need mentioning," said Sir Roger. "Have they not good reason to be afraid of us?"

"What?" I said. "Well, of course we *are* Englishmen. However—" My glance traveled back, over the pitiful few tents pitched around the fortress walls; over ragged, sooty soldiers; over huddled women and grandsires, wailing children; over cattle, pigs, sheep, fowl, tended by cursing serfs; over pots where breakfast porridge bubbled. "However, my lord," I began again, "at the moment we look more French."

The baron grinned. "What do they know about French and English? For that matter, my father was at Bannockburn, where a handful of tattered Scottish pikemen broke the chivalry of King Edward II. Now all the Wersgorix know about us is that we have suddenly come from nowhere and—if Branithar's boasts be true—done what no other host has ever achieved: taken one of their strongholds! Would you not move warily, were you their constable?"

The guffaw that went up among the horse troopers spread down to the foot, until our whole camp rocked with it. I saw how the enemy prisoners shuddered and shrank close together when that wolfish noise smote them.

As the sun rose, a few Wersgor boats landed very slowly and carefully, a mile or so away. We held our fire, so they took heart and sent out people who began to erect machinery on the field.

"Are you going to let them build a castle under our very noses?" cried Thomas Bullard.

"'Tis less likely they'll attack us, if they feel a little more secure," the baron answered. "I want it made plain that we'll parley." His smile turned wry. "Remember, friends, our best weapon now is our tongues."

Soon the Wersgorix landed many ships in a circular formation—like those stonehenges which giants raised in England before the Flood—to form a camp walled by the eerie faint shimmer of a force screen, picketed by mobile bombards, and roofed by hovering warcraft. Only when this was done did they send a herald.

The squat shape strode boldly enough across the meadows, though well aware that we could shoot him down. His metallic garments were dazzling in the morning sun, but we discerned his empty hands held open. Sir Roger himself rode forth, accompanied by myself gulping *Our Fathers* on a palfrey.

The Wersgor shied a trifle, as the huge black stallion and the iron tower astride it loomed above him. Then he gathered a shaky breath and said, "If you behave yourselves, I will not destroy you for the space of this discussion."

Sir Roger laughed when I had fumblingly translated. "Tell him," he ordered me, "that I in turn will hold my private lightnings in check, though they are so powerful I can't swear they may not trickle forth and blast his camp to ruin if he moves too swiftly."

"But you haven't any such lightnings at your command, sire," I protested. "It wouldn't be honest to claim you do."

"You will render my words faithfully and with a straight face, Brother Parvus," he said, "or discover something about thunderbolts."

I obeyed. In what follows I shall as usual make no note of the difficulties of translation. My Wersgor vocabulary was limited and I daresay my grammar was ludicrous. In all events, I was only the parchment on which these puissant ones wrote, erased, and wrote again. Aye, in truth I felt like a palimpsest ere that hour was done.

Oh, the things I was forced to say! Above all men do I reverence that valiant and gentle knight Sir Roger de Tourneville. Yet when he blandly spoke of his English estate—the small one, which only took up three planets—and of his personal defense of Roncesvaux against four million paynim, and his single-handed capture of Constantinople on a wager, and the time guesting in France when he accepted his host's invitation to exercise the *droit de seigneur* for two hundred peasant weddings on the same day—and more and more—his words nigh choked me, though I am accounted well versed both in courtly romances and the lives of the saints. My sole consolation was that little of this shameless mendacity got through the language difficulties, the Wersgor herald understanding merely—after a few attempts to impress us—that here was a person who could outbluster him any day in the week.

Therefore he agreed on behalf of his lord that there would be a truce while matters were discussed in a shelter to be erected midway between the two camps. Each side might send a score of people thither at high noon, unarmed. While the truce lasted, no ships were to be flown within sight of either camp.

"So!" exclaimed Sir Roger gaily, as we cantered back. "I've not done so ill, have I?"

"K-k-k-k," I answered. He slowed to a smoother pace, and I tried again: "Indeed, sire, St. George—or more likely, I fear, St. Dismas, patron of thieves—must have watched over you. And yet—"

"Yes?" he prompted me. "Be not afraid to speak your mind, Brother Parvus." With a kindness wholly unmerited: "Ofttimes I think you've more head on those skinny shoulders than all my captains lumped together."

"Well, my lord," I blurted, "you've wrung concessions from them for a while. As you foretold, they are being cautious whilst they study us. And yet, how long can we hope to fool them? They have been an imperial race

for centuries. They must have experience of many strange peoples living under many different conditions. From our small numbers, our antiquated weapons, our lack of home-built spaceships, will they not soon deduce the truth and attack us with overwhelming force?"

His lips thinned. He looked toward the pavilion which housed his lady and children.

"Of course," he said. "I hope but to stay their hand a while."

"And then what?" I pursued him.

"I don't know." Whirling on me, fierce as a stooping hawk, he added: "But 'tis my secret, d' you understand?"

I nodded. Sir Roger straightened in the saddle. Slowly, his eyes kindled afresh. "I shall not remain so," he vowed. "I do not accept the idea that a *de Tourneville* can be broken." He struck spurs to his horse and galloped into camp.

IX.

During the long wait before Tharixan reached its noontide, my master summoned his captains to a council. A trestle table was erected before the central building, and there we all sat.

"By God's grace," he said, "we're spared thus far. You'll note that I've even made them land all their ships. I'll wrangle to win us as much respite as may be. That time must be put to use. We must strengthen our defenses. Also, we'll ransack this fort, seeking especially maps, books, and other sources of information. Those of our men who're at all gifted in the mechanic arts, must study and test all the machines we find, so that we can learn to fly and erect force screens and otherwise match our foes. But all this has to be done secretly, in places hidden from enemy eyes. For if ever they learn we don't already know all about such implements—" He smiled and drew a finger across his throat.

Good Father Simon, his chaplain, turned a little green. "Must you?" he said faintly.

Sir Roger nodded at him. "I've work for you, too. I shall need Brother Parvus to interpret Wersgor for me. But we have one prisoner, Branithar, who speaks Latin—"

"I would not say that, sire," I interrupted. "His declensions are atrocious, and what he does to irregular verbs may not be described in gentle company."

"Nevertheless, until he's mastered enough English, a cleric is needed to talk to him. You see, he must explain whatever our students of the captured engines do not understand, and must interpret for any other Wersgor prisoners whom we may question."

"Ah, but will he do so?" said Father Simon. "He is a most recalcitrant heathen, my son, if indeed he has any soul at all. Why, only a few days ago on the ship, in hopes of softening his hard heart, I stood in his cell reading aloud the generations from Adam to Noah, and had scarcely gotten past Nimrod when I saw that he had fallen asleep!"

"Have him brought hither," commanded my lord. "Also, find One-Eyed Hubert and tell him to come in full regalia."

While we waited, talking in hushed voices, Alfred Edgarson noticed how I sat quiet. "Well, now, Brother Parvus," he boomed, "what ails you?"

Methinks you've little to fear, being a godly fellow. Even the rest of us, if we conduct ourselves well, have naught to fear but a sweating time in Purgatory. And then we'll join St. Michael at sentry-go on Heaven's walls. Not so?"

I was both loath to dishearten them by voicing what had occurred to me, but when they insisted, I said, "Alas, good men, worse may already have befallen us."

"Well?" barked Sir Brian Fitz-William. "What is it?"

"We had no sure way to tell time on the voyage hither," I whispered. "Hour glasses are too inaccurate, and since reaching this devil-made place we've neglected even to turn them. How long is the day here? What time is it on our Earth?"

Sir Brian looked a trifle blank. "Indeed, I know not. What of it?"

"I presume you had a haunch of beef to break your fast," I said. "Are you sure it is not Friday?"

They gasped and regarded each other with round eyes.

"When is it Sunday?" I cried. "Will you tell me the date of Advent? How shall we observe Lent and Easter, with two moons morris-dancing about to confuse the issue?"

Thomas Bullard buried his face in his hands. "We're ruined!"

Sir Roger stood up. "No!" he shouted into the strickenness. "I'm no priest, nor even very godly. But did not Our Lord Himself say the Sabbath was made for man and not man for the Sabbath?"

"I like it not," mumbled Bullard. "I take this to be a sign that God has turned His face from us, withdrawing the due times of the fasts and sacraments."

Sir Roger grew red. He stood a moment more, watching the courage drain from his men like wine from a broken cup. Then he calmed himself, laughed aloud, and cried:

"Did not Our Lord command His followers to go forth as far as they were able, bringing His word, and He would be with them always? But let's not bandy texts. Perhaps we are venially sinning in this matter. Well, if that be so, a man should not grovel but should make amends. We'll make costly offerings in atonement. To get the means for such offerings . . . have we not the entire Wersgor Empire at hand, to squeeze for ransom till its yellow eyes pop? This proves that God Himself has commanded us to this war!" He drew his sword, blinding in the daylight, and held it before him hilt uppermost. "By this, my knightly sigil and arm, which is also the sign of the Cross, I vow to do battle for God's glory!"

He tossed the weapon so it swung glittering in the hot air, caught it again and swung it so it shrieked. "With this blade will I fight!"

The men gave him a rather feeble cheer. Only glum Bullard hung back. Sir Roger leaned down to that captain, and I heard him hiss: "The clinching proof of my reasoning is, that I'll cut anyone who argues further into dogmeat."

Actually, I felt that in his crude way my master had grasped truth. In my spare time I would recast his logic into proper syllogistic form, to make sure; but meanwhile I was much encouraged, and the others were at least not demoralized.

Now a man-at-arms fetched Branithar, who stood glaring at us. "Good day," said Sir Roger mildly, through me. "We shall want you to help interrogate prisoners and instruct us in our studies of captured engines."

The Wersgor drew himself up with a warrior's pride. "Save your breath," he spat. "Behead me and be done with it. I misjudged your capabilities once, and it has cost many lives of my people. I shall not betray them further."

Sir Roger nodded. "I looked for such an answer," he said. "What became of One-Eyed Hubert?"

"Here I am, sire, here I am, here's good old Hubert," and the baron's executioner hobbled up, adjusting his hood. The ax was tucked under one scrawny arm and the noosed rope laid around his hump. "I was only wandering about, sire, picking flowers for me youngest grandchild, sire."

"I've work for you," said Sir Roger.

"Ah, yes, sire, yes, yes, indeed." The old man's single rheumy eye blinked about, he rubbed his hands and chuckled. "Ah, thank you, sire! 'Tis not that I mean to criticize, that ain't old Hubert's place, and he knows his humble place, him who has served man and boy, and his father and grandsire afore him, executioners to the noble de Tourneville. No, sire, I knows me place and I keeps it as Holy Writ commands. But God's truth, you've kept poor old Hubert very idle all these years. Now your father, sire, Sir Raymond, him we called Raymond Red-Hand, there was a man what appreciated art! Though I remember his father, your grandsire, me lord, old Nevil Rip-Talon, and his justice was the talk o' three shires. In his day, sire, the commons knew their place and gentlefolk could get a decent servant at a decent wage, not like now when you let 'em off with a fine or maybe a day in the stocks. Why, 'tis a scandal—"

"Enough," said Sir Roger. "The blueface here is stubborn. Can you persuade him?"

"Well, sire! Well, well, well!" Hubert sucked toothless gums with a pure and simple delight. He walked around our rigid captive, studying him from all angles. "Well, sire, now this is another matter, 'tis like the good old days come back, 'tis, yes, yes, yes, yes, Heaven bless my good kind master! Now o' course I took little equipment with me, only a few thumbscrews and pincers and such-like, but it won't take me no time, sire, to knock together a rack. And maybe we can get a nice kettle of oil. I always says, sire, on a cold gray day there ain't nothing so cozy as a glowing brazier and a nice hot kettle of oil. I think o' my dear old daddy and I gets tears in this old eye, yes, sire, that I do. Let me see, let me see, tum-te-tum-te-tum." He began measuring Branithar with his rope.

The Wersgor flinched away. His smattering of English was enough to give him the drift of conversation. "You won't!" he yelled.

"Now let's just see your hand, if you please." Hubert took a thumbscrew from his pouch and held it against the blue fingers. "Yes, yes, 'twill fit snug and proper." He unpacked an array of little knives. "*Sumer is Icumen in*," he hummed, "*lhuðe sing cucu*."

Branithar gulped. "But you're not civilized," he said weakly.

Choking and snarling: "Very well. I will do it. Curse you for a pack of beasts! When my people have smashed you, it will be my turn!"

"I can wait," I assured him.

Sir Roger beamed. But suddenly his face fell again. The deaf old executioner was still counting over his apparatus. "Brother Parvus," said my lord, "would you . . . could you . . . break the news to Hubert? I've not the heart to tell him."

I consoled the old fellow with the thought that if Branithar were caught lying, or otherwise failing to give us honest help, there would be punishment. This sent him hobbling happily off to construct a rack. I told Branithar's guard to make sure the Wersgor saw that work.

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THE TROUBLE- MAKER

By
CHRISTOPHER
ANVIL

Illustrated by Schoenherr

There's no more suitable punishment—or reward—for a man than to give him just exactly what he wants. The old three-wishes fairy stories knew that; our ancestors may have been ignorant, but only a fool would think them stupid! Now usually a troublemaker is looking for trouble. . . .

12/02/96 Probably the closest thing to hell on a commercial spaceship is to have the gravitor control run wild. Next on the list is what happens when there's a troublemaker in the crew.

Three years ago, we had the first experience. It looks as if we are now about to have the second.

The trouble started when Krotec, our cargo-control man, was killed by a freak meteor at the cut-loose point. We had just thrown the cargo section into hyperdrive and were swinging around to get an empty returned section from the recovery crew when the meteor hit. We all felt bad about Krotec's death. But there was nothing we could do except head back to the loading center as usual.

When we got back to the loading center, word came in that a replacement for Krotec was due on board at 2330.

The captain insists that each new man be greeted as he comes on board. Willis and I, respectively third and second in command, offered to do the greeting. Willis got the job.

Around 0130, Willis woke me up.

"Listen," he said, "that replacement hasn't showed up yet. The transport office says he started out in a little one-man taxi-boat two hours and twenty minutes ago. Do you suppose he's drunk?"

"I hope not."

A cargo-control man has to inspect and approve each cargo before it can be shipped. Because of this, a drunk cargo-control man can cause a long delay. Each delay cuts down the ship's competitive rating. And each cut in the rating means a cut in the bonus given to the officers and crew of the fastest ships.

"Listen," I said. "We're just loading grain, aren't we?"

"We are. Just a few hours more and we'll be full up. If we can get out of here by 0800, we've got a chance to beat *Nova* and get first place for a change. But we've got to get this cretin to start checking cargo before we can even think of leaving."

"How about the transport office? Do they know where this one-man taxi-boat is now?"

"All they can say is that a rough fix shows it's somewhere in B cargo area, and it's sending out an 'unoccupied' signal. That means our replacement has matched locks with some other boat or ship in our area, and left the one-man boat."

It took a few moments to absorb what this meant. Each ship takes its share of fast and slow cargoes. While we were loading grain and leaving tomorrow, other ships were taking on fragile goods that would keep them at the loading center for several days. On some of these ships roaring parties

were now going on. If our wandering cargo-control officer got into one of these parties, it would be no easy job to get him out.

"Well," I said, dressing quickly, "we can't very well start asking where he is."

"No," said Willis sourly. "There are those who would load him up with rum and hide him somewhere just to gain a few points on us."

"That means there's nothing else to do but get another taxi-boat and go hunt for him. One-man boats aren't used much, so we've got a chance."

A couple of hours later, this chance seemed to have gotten pretty thin. I had been staring into the glaring lights and shadows all over B cargo area, and Willis had been calling the transport office at intervals. The transport office insisted the one-man boat was still in B area. But if so, I hadn't seen it. An unpleasant possibility was just beginning to dawn on me when Willis appeared on the little screen, his face white and set.

"Don't bother looking for him any more. He's here."

The screen went blank. I went back to the ship, and saw that the boatlike bulk of the pressure loader had stopped pulsating. Willis was waiting in the control room as I went in.

"You know," he said, "that so-and-so was right here all the time? He was hooked onto the cargo-section's lock, out of sight in the shadow of the ship. That means he has been alone in the cargo-section for a long time, without our knowing it."

"I notice we aren't loading."

"No, we aren't loading. He came in here, and used the screen to get the chief inspector's office. He says there's 'danger of possible weevil infestation' in the cargo, and he's slapped a forty-eight-hour delay on the ship."

"That's ridiculous."

"Is it? Don't forget, the inspector here is a stickler for caution. Any cargo-control man who shows caution gets a pat on the head. And since Krotec got hit before we picked up the empty cargo section, that means we were without a regular cargo-control officer to check the cargo section."

"Yes," I said, "but the captain checked it himself." I was thinking that the captain is a fanatic for efficiency, a rigid teetotaler, an early-to-bed-early-to-rise man with iron habits and unvarying devotion to duty. It suddenly occurred to me that this would carry no weight whatever with the chief inspector. "Look," I said, "the captain has qualified as a cargo-control man. He's perfectly able to serve as one in a pinch."

Willis smiled. "Sure. But what I am talking about is how it will look on paper. The captain is not a *regular* cargo-control man. The inspector, not knowing the captain, will generously assume that the captain was out of practice and missed something. We will therefore be hung up here till the inspector goes through all his motions. *Nova* will beat us by light-years. But what I am thinking about most is what life on board the same ship as this self-seeking troublemaker is going to be like."

12/03/96 After about three hours' sleep, I woke up to find that the captain wanted to see me. Willis was on the way out as I went in. The captain listened intently as I told what little I knew of what had happened the night before. Then he leaned back with his eyes narrowed.

"Well," he said, "we want to be fair to this man. But I don't think we

ought to lean over backward so far he can kick our feet out from under us. Suppose you go out there and study his record folder while I get him in here and study him."

I agreed, and in due time started back to the captain's compartment carrying the record folder of one L. Sneat in a portfolio. The captain's door opened up and our new cargo-control man backed out with a slightly glazed look, and both hands spread wide. He was talking in the low earnest voice of the smooth wolf suddenly face-to-face with the girl's father and three tough brothers.

"Why should I, captain?" he was saying. "It wouldn't make sense, would it? Honestly, I *mean* it. Who would do a thing like that? And to the people he has to live with, too?"

"Just bear in mind," came the captain's voice, "if you have several hundred dollars in the bank, you can write quite a few twenty-dollar checks, and nothing happens to you. But write just one check too many and all hell breaks loose."

"Captain, I just don't understand—"

"Then go think it over."

Our new replacement moved away protesting his innocence as I went in and shut the door. The captain was frowning slightly.

"Some people," he said, "are all tactics and no strategy. They are so busy elbowing their way to the head of the line that they never look to see where the line is going." He glanced at me and said. "What did you find out?"

"Our friend was born in '68 on an outpost world called 'Broke.' He passed a company competitive exam, got good grades, and has been a cargo-control man a little less than four years. He has several commendations on his record and no black marks. Our ship is the eighth ship he has been cargo-control man on."

"In four years?"

"Yes, sir. Eight ships in four years."

"Let's see that folder."

I handed it to him.

It may have been imagination, but I thought I saw the captain's back hair rise up as he looked at the names of those ships. He growled, "Go get the latest rating and bonus list."

"Right here, sir."

The captain put it beside the record folder and glanced from one to the other.

Glancing over the captain's shoulder, I could see the names of the seven ships our new cargo-control man had been on before being assigned to ours. They were *Calliope*, *Derna*, *Hermes*, *Orion*, *Quicksure*, *Light Lady*, *Bonanza*.

The lowest seven names on the rating and bonus lists were: *Calliope*, *Derna*, *Hermes*, *Orion*, *Quicksure*, *Light Lady*, *Bonanza*.

Bonanza was in such bad shape that it had a bonus of minus 27.92. That is, the officers and men of *Bonanza* were paying back 27.92 cents out of every dollar they earned, as a fine for inefficiency.

The captain looked at this for a while, then sent for the records tape covering previous ratings and bonus lists.

A quick glance at these lists showed us that the month before Sneat boarded *Bonanza*, that ship had a rating of 94.98 out of a possible 10.000

One month later, *Bonanza's* rating was 76.01.

The captain looked at the record folder again. He had much the same expression as a settler on a new planet, who walks slowly past a tree, ax in hand, while he judges which way the tree will naturally fall, whether it is worth felling, and if so, where to sink the ax in first.

Then he looked up, smiled, and said we'd certainly have to work hard to make up for the delay. That was all he had to say for the moment.

12/04/96 Well, we're moving at last. No weevils were found. But Sneat produced some debris containing what could have been either pieces of bast-weevil wing-covers—or else bits of the brownish semitransparent insulation used on much of the wiring aboard ship. If it was from wiring, of course, it could have been carelessly dropped by anyone. Sneat has tried to get out of a head-on clash with the captain by claiming that this stuff was found, not inside the inner part of the cargo section, but in the outer inspection corridor. This corridor was thoroughly gone over by Gaites, one of our technicians, before the captain ever went into the cargo section itself. But since Gaites has a reputation for taking life easy, Sneat has succeeded in unloading part of the blame. Meanwhile, Sneat has on his record the inspector's commendation for extreme thoroughness.

12/07/96 Sneat seems to be weathering his unpopularity pretty well, all considered. For some reason, Gaites is now getting most of the blame for the delay.

12/08/96 Another facet of Sneat's character has come to light. The one officer on the ship with any social standing is Grunwald, the navigator. Grunwald's uncle is governor of New Venus. Grunwald likes chess. Sneat has now taken several tapes on chess out of the ship's library.

12/12/96 In the rec. room tonight were Grunwald and Sneat, playing chess. Afterward, Grunwald expansively pointed out certain fine points of the game. Sneat was all ears—an attentive student eager to learn from the master.

A peculiar thing has turned up lately. On most of our trips, there is a feeling on the ship of well-earned contentment. On this trip, however, there is an undercurrent of rankling dissatisfaction. The original delay, and the charges and countercharges between Sneat and Gaites, seem to have started it. But now that it is started, it apparently goes along by itself, one man speaking sharply to another, to produce a vicious circle that is gradually changing the emotional atmosphere of the ship.

What the captain plans to do about it isn't clear. I've remarked on it to him, but it may well be that he doesn't appreciate it. Around him personally, everything is as it was before.

12/15/96 Sneat now seems to be close friends with Grunwald. He is also getting to be friends with Meeres, the medic. Meeres is interested in psychology. Lately, Sneat has been busy with the psychology tapes. Soon he should be able to listen and ask questions intelligently, which should seem fine to Meeres.

12/18/96 If Sneat isn't playing chess with Grunwald, he is likely to be talking psychology with Meeres.

12/19/96 So as to keep Sneat from step-by-step turning the whole ship, with the exception of the captain and me, into an "I love Sneat" society, I've pointed out to Willis what is going on. Strange to say, Willis hadn't noticed it. Now that he does notice it, he is once more turning a cold eye on Sneat. The sorry part of this is that the ship is being split into factions.

12/20/96 Willis tells me that Sneat has been needling Ferralli, the drive technician, because Ferralli is overweight. The rest of the crew has also kidded Ferralli, but that was good-natured. Sneat's procedure is different. The other day, he asked Ferralli, "Say, boy, are you expecting?" Ferralli smiled dutifully. After a few wisecracks, any other crewman would have let it go. But Sneat harps on the theme: "Say, is it going to be a boy or a girl?" "What are you going to call it?" Sneat has now given this mythical baby a name—"Oswald"—and the whole business is getting on Ferralli's nerves. This is the kind of joke other crewmen will drift into when they can't think of anything better to say, and it is only a matter of time till Ferralli lashes back. Very quickly we may get into a situation where everyone is jabbing everyone else's weak point, and then this ship will be quite a place to live.

12/21/96 I just had a talk with Ferralli. In the less than three weeks since this trip started he has changed from a happy-go-lucky crewman to a mass of bitterness. He says everywhere he turns, someone asks, "How's Oswald?" Everyone, that is, except Sneat. When the going gets rough, Sneat is likely to stop it, saying, "Ah, come on, fellows, break it up. He needs his strength." Ferralli says he knows Sneat starts it; but when Sneat gets the others to leave him alone, Ferralli actually finds himself feeling grateful. The thought goes through his head, "Sneat isn't such a bad guy, after all." I said I supposed this was exactly what Sneat wanted. Ferralli suddenly burst out, "If he doesn't leave me alone, I'll kill him!"

12/22/96 Now, too late, I see why Sneat singled out Ferralli to pick on. Nearly everyone is now afraid of Sneat's tongue. If this were a military ship, we would no doubt so cramp Sneat that his effect would be barely a tenth what it is now. But as it is, it's a civilian ship, with civilian restrictions, and on top of that the captain seems to be patiently waiting for something. What he is waiting for, I don't know. Meanwhile, there is a steadily increasing amount of bad feeling building up, that gives the impression of an open powder keg just waiting for a match. Sneat has begun calculatedly insulting Willis and me, so it seems obvious which way the force of the explosion is supposed to go. So far, Willis and I have had several clashes with Sneat, but he is clever with words, and always wins. Lately I have caught myself wondering how Sneat would react if he found himself stuffed head first into the garbage disposal unit.

12/23/96 Willis suggested that I change shifts at dinner tonight so I could see for myself how Sneat operates during meals. The captain generally switches from shift to shift to check on the quality of the food, and as a rule

takes his tray elsewhere at dinner—so that if we lesser ranks want to indulge in horseplay, he won't cramp our style.

But tonight, to my surprise, the captain stayed to eat with the rest of us.

We had hardly sat down, in a general atmosphere of dull brooding apathy, when Willis nudged me, and I heard Sneat make a needling comment to Meeres, to the effect that Ferralli seemed to be "eating for two," didn't he?

I was just starting to wonder how anyone could possibly control that kind of needling when the captain's voice said coldly, "What was that, Sneat?"

For just an instant, Sneat looked jolted. Then he glanced up and said ironically. "Did you say something, captain?"

In the same cold voice, the captain, said, "As you know, Sneat, you just made a comment about someone 'eating for two.' Explain it."

"Just part of a private conversation, captain."

"You mean it doesn't have anything to do with anyone else here? Just you and Meeres?"

"Did I say that?"

The captain didn't say anything for a moment, and Sneat smiled very faintly. I glanced at the captain, feeling the same frustration I'd felt when arguing with Sneat myself. The captain, however, was looking at Sneat with an expression of intense concentration. Something seemed to rise up in the backs of his eyes as he said, in a very gentle voice, "Do you understand the laws on 'incitement to mutiny,' Sneat?"

A heavy silence settled in the room. Sneat looked jarred for the second time. So was I. It seemed to me that Sneat had skillfully avoided that pitfall.

Before Sneat could say anything, the captain said, looking directly at Sneat, "Why are you so afraid to explain that comment you just made to Meeres?"

"I've already explained to you, captain, that that was part of a private conversation."

"I notice, Sneat, that you avoid the word 'sir' as if you were afraid of it. Just what is it you're afraid of?"

A faint puzzled expression crossed Sneat's face. He opened his mouth and shut it again. Then he stiffened angrily. It occurred to me that somehow the captain had thrown him off-balance.

Again, before Sneat could say anything, the captain spoke.

"You know, Sneat, a private conversation is usually a conversation not many people know about. You don't carry out a private conversation in a loud voice, with other people around, do you?"

Sneat relaxed, and spoke in a drawling voice.

"Well, if you must know, captain, and if you want to make Ferralli feel bad—go ahead and ask."

"Then you admit that what you said was intended to make Ferralli feel bad?"

"No, but your rubbing it in might make him feel bad. Probably has already, in fact. Why don't you drop it, captain?"

By now, everybody was glancing tensely from Sneat to the captain. The captain was looking directly into Sneat's eyes as he spoke again.

"You know, you can start trouble, but you can't expect always to drop it and slip out from under, leaving other people to bear the burden."



Sneat started to speak, and the captain added, "There comes a time when the burden lands on *you*."

Sneat sat very still, then casually shoved his chair back.

"You're the first captain I've ever met who tried to badger his crew. I don't think I care to finish this meal."

"People who needle others shouldn't be so sensitive. Just as a cargo-control man who causes a forty-eight hour delay shouldn't try to shift the blame to someone else."

This caused a general stir in the room. The captain made this comment just as Sneat started out, and added, "Naturally, if you have nothing to say in your own defense, you *should* go."

Sneat suddenly swung around and snapped, "That cargo section was filthy!"

Gaites was at the table, and stood up. "The devil it was! It was clean!"

Sneat cast a shrewd calculating glance at Gaites. "Everyone knows you're lazy."

"Yeah? Do you want a punch in the teeth?"

The captain said coldly, "Gaites has been on this ship for a long time, and we never had a delay or a complaint. You no sooner stepped on board then we had a forty-eight hour delay, for weevils that weren't there. Every previous trip we've taken has been pleasant. Since you've been here there's been nothing but trouble." The captain paused, then added, "Unfortunately, I am forbidden by regulations to reveal anything about the ship or ships you were assigned to before this one."

Sneat opened his mouth, then closed it again. A look of angry indignation crossed his face.

The captain waited politely, and then someone started to laugh. In a moment, everyone would have been laughing, because Sneat was neatly caught in his own traps. Everyone *would* have been laughing but the instant the first person laughed, Sneat glanced directly at him and said, "Shut up."

This produced another tense silence, and suddenly something in the air of the ship seemed to change.

A tall crewman stood up, and said slowly, "I was laughing, Sneat. Now, with all respect to the captain, I would like to make just one comment. If I may, sir?"

He glanced courteously at the captain.

"Go ahead," said the captain.

Sneat abruptly turned on his heel and started out of the room.

The tall crewman looked at our cargo-control man's retreating back and said clearly, "I am inviting you, Sneat, to tell me 'shut up' just once more, either now or later."

Sneat walked out without replying.

The tall crewman glanced around before sitting down. A set of hard approving glances answered him. Then he looked directly at the captain, and said, "Thank you, sir."

The captain smiled. "You're very welcome." He added, "Now, I would like to make a brief announcement." There was an immediate silence, and the captain said, "The base has granted us a Christmas present. We have been given permission to land and spend December 25th and 26th on the planet of New Cornwall."

There was a startled silence, then a roar of cheers. *Planetfall!* How the captain managed to wring that out of Base, I don't know. But all of a sudden we were the same old ship again. The mood and atmosphere that had been missing were back once more. Suddenly the crew began to sing, "For he's a jolly good fellow."

In the midst of all this renewed good will, with everyone feeling like his own self again, I happened to look at the door.

And there was Sneat, looking in.

He was still with us.

12/24/96 I asked the captain today if there was anything we could do to transfer Sneat, or in some way get him off the ship. I suggested that if he happened to stay behind on New Cornwall, that would be fine.

"You mean," said the captain smiling, "if he should by chance get cracked over the head and dumped up some secluded alley, just before we take off?"

"That's what I had in mind, sir."

"Hm-m-m. Well, we can reserve that as a last resort. But I don't think it will be necessary. Do you know much about New Cornwall?"

"No, sir. Of course, we've all been looking it up in the atlas. It's a planet now well into its first stage of industrialization, with a fast-growing population. I don't understand their government system."

"What don't you understand about their government?"

"According to the atlas it's a 'representative absolute monarchy.' There couldn't be such a thing."

"Well," said the captain, smiling, "wait a while. And don't be too hasty

about tossing Sneat up an alley with a big bump on his head. Bear in mind how men have always dealt with troublesome creatures."

"What do you mean, sir?"

"Men bait rattraps with cheese and bacon."

I stared. "But how does this help us with Sneat?"

"Why does Sneat try to terrorize a whole ship? What does he like about this? I'll tell you my opinion: Sneat likes power."

12/26/96 Well, we came down to the planet in the tender, and yesterday was a wonderful Christmas.

To begin with, we no sooner landed than crowds of people welcomed us, and we were all given invitations to spend Christmas with individual families. While we were still overwhelmed from this, we got the additional shock of seeing local officials snap to attention, salute the captain, and call him "your highness." This seemed fairly ridiculous, but the captain took it calmly and pretty soon a white motorcar drove up, there was a blast of trumpets, and everyone fell on his face except the captain and the rest of us from *Starlight*. This incident left us feeling totally out of focus. But that is small price for having forty-eight hours leave on a real planet. We were willing to overlook the strange local customs.

The next thing we knew, a flunky jumped off the back of the white car, grabbed a polished silver handle and hauled open the rear door. He flattened himself in the dust as a fresh crew of flunkies rushed to unroll a long purple rug about two-and-a-half feet wide. This stretched from the rear door of the car to the captain. This bunch of flunkies then fell in the dust.

While we are staring at this, there stepped out of the car a tall man with a grim enduring look, dressed in several yards of white cloth trimmed in gold and silver, with flashing epaulettes, several rows of medals on each side of his chest, a purple sash, a sword, and a silver and gold baton in his hand.

This mass of flashing color strode up toward the captain, and they stared each other in the eye.

The captain seemed to have a faint smile as he said in a loud clear voice, "How stands the kingdom, your royal and imperial majesty?"

"It stands well, as you left it, your royal highness."

Just in front of the car, one of the loyal subjects was getting this all down with some kind of camera on a tall tripod. He was doing this while lying flat on his stomach, and staring into a periscope arrangement with a couple of remote-control handles that aimed the camera.

I was beginning to wonder if this wasn't some kind of joke or carnival performance, when somebody nudged my arm. I realized it was Sneat. In a low voice, he said, "Look there."

I looked, and saw, about eighty feet away, an armored car with its gun aimed at us. There was another one nearby, and near that about thirty men carrying long guns and wearing over their left breast pockets an emblem like a silver gunsight.

I glanced around uneasily. "What is this, a trap?"

"No, no," said Sneat, in a low excited voice. "It's the king's guard. See that crown on their left shoulders?"

True enough, that did seem to be it. I looked hard at Sneat in curiosity. It was the first time I had seen him with that eager excited look.

Well, in due time the formalities between the captain and the local king were all concluded, they bowed to each other and the king turned around and started back to the car. The set of flunkies that handled the purple rug sprang into action and rolled it up behind the king as he neared the car. A new set staggered around carrying another rolled-up rug, which they set down in front of the captain. As fast as the first set rolled up the purple rug, the second set unrolled a light pink rug with a purple stripe down each side. Along this, the captain walked.

I glanced around as this procession headed for the car. First the king, then a bunch of flunkies rolling the rug up about two steps behind him, then a new bunch unrolling another rug, then the captain walking along about two steps behind them. All around me were men from *Starlight* with their jaws hanging open, eyes staring, and glancing back and forth from the car to the line of armed guards.

About this time, a third set of flunkies heaved the top off the rear of the royal car, and a fussy individual began rearranging the cushions. The king and the captain got in, all the rugs were rolled up, and the car set off to a blast of trumpets.

Sneat said in irritation, "That business with rugs was overdone."

I stared at him, trying to see his viewpoint. But now all the populace, that had been flat on their faces a minute ago, stood up. They seemed to think nothing of having spent all that time flat on the ground, but immediately took up the conversation where they had left off, so that in a few minutes we were each setting out in company with a different family.

Well, we had a morning of sightseeing, many of us went to church, and we all had a big Christmas dinner. The main topic of local conversation was the coming selection. I listened in silence as long as I could, but finally was overcome by curiosity.

"Election?" I asked.

"Oh, no," said my host. "*Selection*. You see, his majesty has worked at the job for a decade now. Naturally he's tired. Tomorrow a successor will select himself."

"Select himself?"

"Of course. The job is a tremendous burden, you know. It would hardly be fair to *force* it upon anyone."

"You mean, someone *volunteers* to be king?"

"Exactly."

"Well—What if a halfwit—"

"Such people are not qualified."

"All right. But if your kings are *absolute* monarchs, what's to prevent you from ending up under a dictator?"

Everyone laughed. "True," said my host, "in the bad old days back on Earth, such things happened. But here, modern science prevents it. *Our* kings think only of the good of their subjects."

"How does modern science manage that?"

"I'm sure I couldn't say."

"How do your kings 'select themselves'?"

"Why, we gather in the great arena. The first man to cross the line is king."

I stared. "A sort of race?"

"Oh, no. Not a race. There is never a rush to step over the line. You'll see what I mean."

It developed that the tests we had been required to pass to become spacemen were stiff enough to qualify any of us to become king of New Cornwall if we wanted, and therefore we all ended up the next day with our hosts in a gigantic sports arena hung with silver and gold banners, and with a long straight purple line drawn down the length of the arena.

As we watched, a military band played a march, a line of horsemen in blue uniforms with silver breastplates and drawn swords rode in, there was a blast of trumpets, and the king came in followed by a herald with a big scroll, who walked out to a microphone set almost at the purple line, raised the scroll, and read:

"Be it known, that our illustrious king and emperor, desiring to lay down the heavy burden of his duty, hereby throws open to all you qualified and assembled—be you of native birth or whatever, so long as you be human—the right to ascend the throne.

"With this right, be it well and clearly known, pass the command of all the armed forces of the planet New Cornwall, and the absolute right to command of each citizen what you will, and to be obeyed.

"Whosoever desires to achieve this absolute authority, and whosoever is willing to accept the heavy burden it entails, let him so signify by stepping forward across this line."

There followed a half-hour harangue to point out the nobility of taking up the burden, and the need to give the present king, who had worked hard all this time, a well-earned rest.

At the end of this half-hour, Sneat stepped forward and crossed the line. Sneat is now king of New Cornwall.

12/27/96 This evening, I was busy filling out the necessary forms to account for the disappearance of Sneat, when the captain walked in.

"Well," he said, "that was better than bashing him over the head, wasn't it?"

"Yes, sir," I said. "This really gets him out of the crew for good. A little rough on the planet, though."

"Oh, no. Sneat will make a good king." The captain spoke in the positive manner of one who knows by direct experience. He added, "After all, he hasn't any *choice* in that matter."

I shoved back the forms and turned around to face the captain. He was looking at me with his usual expression, which is a sort of quiet authority. A slight change of the lines around mouth and eyes can shift this expression to one of friendly warmth or arctic chill. It was now necessary to risk the chill.

"Sir," I said, "you realize that this ship is a mass of boiling curiosity?"

"It's good for them," said the captain, with a faint grin. "It will take their minds off their troubles."

"I can't think," I said, "of anyone I'd want to have over me as an absolute monarch. But if I *had* to choose someone for that position, the last person I'd pick would be Sneat."

"And yet," said the captain, "most people you might pick would kick and scream to get out of the job. Sneat *wants* it."

"Yes," I said. "As you remarked earlier, Sneat seems to love power. But does that mean he should *have* power? Human history is overburdened with men who loved power, got it, misused it, made their subjects miserable, and were finally overthrown by some new power-maniac. Then the new man went through the same process as the one before."

"True, but all that is systematized down on New Cornwall. The average king only lasts about eight to ten years. After that, he can't get rid of the power fast enough."

"Then there must be special conditions," I said.

The captain nodded. "There are special conditions. It would be interesting to know why it is that great genius will suddenly appear in one place, and not in another place where conditions look just as favorable. New Cornwall, as you know, is not fully industrialized. But its citizens trade their products with worlds that are industrialized. Advanced electronics equipment is available on the planet, and of course, it has to be kept in repair. Skilled repairmen make an excellent living. It is like this on other worlds, but it was on New Cornwall that the genius appeared."

I listened intently, and the captain went on. "This man became interested in the relationship between the electrical current used in man-made apparatus, and the impulse that passes along a nerve in the body of an animal. The result of his studies was a tiny device called a 'neurister.' A neurister, surgically inserted in the proper place, can receive from outside a signal especially keyed to it. The result of this signal is that the neurister stimulates a nerve nearby. And the result of this is that the person in whom the neurister has been inserted feels a sensation from that part of his body."

A chill traveled up and down my spine. "What kind of sensation?"

"Depending on the circumstances, a sense of uneasiness, a pressure, an itching, a burning, a feeling of pain, or—in the extreme—downright agony. From the king down through the dukes and earls to the lowest squire, the governing authorities on New Cornwall are all liberally supplied with neuristers."

The captain glanced at his watch, and added, "About this time, I imagine, Sneat is stretched out on the operating table."

"Much as I dislike Sneat," I said, "I wouldn't have wished this on him."

"You didn't have to. He chose it himself."

"Who pulls the switch that sends the pain through him if he gets out of line?"

"Each of the nobles has, while he's in office, not only a set of neuristers, but what corresponds to a relay, located within his body cavity. Each of the loyal subjects on the other hand, has within him a small device corresponding to a transmitter."

Suddenly it dawned on me. "You mean—If, say, some dark night there's a catastrophe like an earthquake or a flood—?"

A faint grin crossed the captain's face, and he nodded. "Squires, knights, baronets, barons, viscounts, earls, marquises, dukes, princes, and king—everyone having any authority in the region—suddenly wakes up with a pain in the part of his anatomy that corresponds to the source of the trouble."

The king, for instance, is likely to come to at 3:00 a.m. with a peculiar grinding pain in the upper part of the calf of his left leg, whereupon he will jump out of bed shouting, 'Quick! I think another typhoon just hit Bijitoo! Get the disaster crews ready!' The Viscount of Bijitoo, whose whole body is now one living ache, will already be doing everything possible."

"But," I said, "if Sneat has absolute authority, tell me why couldn't he order the neuristers removed?"

"Yes, but here is the real work of genius. A special type of neurister-transmitter responds directly to a triggering impulse from the brain of the king or nobleman who has it. The activating impulse is the thought of evading duty."

"Then what happens?"

"Every neurister in the body is activated. It's like a slow dip in boiling oil."

"It has its compensations," said the captain. "He will have as much authority and respect as he could easily ask for. After the conventional term, a new selection will be held, the neuristers will be removed, he'll have a bonus and a small but steady income. The people will respect him, and whenever he's on the planet he'll have full honors and the courtesy title of 'your highness.'"

Suddenly I was alert. "They'll call him, 'your highness'?"

The captain nodded, then smiled and rolled back his sleeve. Above the wrist, his muscular arm was marked with a number of small fine scars. He said, "I know whereof I speak."

A moment later we had said goodnight, and he was gone.

I sat still, aware of the change that had taken place in the ship in the past few days. Once more everything seemed smooth, efficient, and good-natured. There could be little doubt that the captain knew how to run things. No wonder.

THE END

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THE BROTHERHOOD OF KEEPERS

By DEAN McLAUGHLIN

Rightness seems to bear no discernible correlation with righteousness—particularly when fear, or that subtle form of greed known as publicity-seeking gets involved. . . .

Illustrated by Bernklau



PROLOGUE

The cold wind screamed and drove dart-chips of crystal stuff deep into Chier-cuala's fur.

Chier-cuala struggled up the hill. It was hard going. His walking flippers couldn't find good footing in the white, soft powder that smothered the land, and the slope was steep. His stubby legs ached with fatigue. He floundered and wallowed in the white powder. It was cold.

He couldn't remember any cold time like this one. Never had it been so cold. Never had the wind blown so hard—so endlessly. It had not stopped for many sleeping times. And never had the strange white powder lain so thick on the ground.

Chier-cuala couldn't understand.

The cold, hard darts of crystal stuff clung to his fur. He brushed them away. The wind plastered more against him. The wind leaked through his thick pelt and chilled him. His walking flippers ached and throbbed with the cold. He whimpered softly.

Stubbornly, he pressed on toward the crest of the hill. He needed food. His hunger was a compelling agony. It was the only thing that could have driven him out into this cold and wind. Always before, when a cold time came, he had huddled in his lair until it stopped—until the sky was blue again, and the powderlike white stuff on the ground turned to wetness, and the air turned warm.

But this time the cold had not stopped, and the wind still blew, and the sky remained gray. He had not eaten since . . .

He remembered the last thing he ate—the small, clumsy creature he had caught in the recesses of his lair. It was so small he would have ignored it, except he was starved.

And after he ate it, he had slept through a dark time, and then there was a bright time during which he did not eat because there was nothing, and then another dark time through which his sleep was troubled by visions of edible creatures.

Now, forced out of his lair by his hunger, he climbed the hill. The odd creatures on the hilltop had given him good things to eat, sometimes, when he did things which they made him understand they wanted him to do. Purposeless things, and some of them were very hard, but the odd creatures gave him good things to eat when he did them.

The slope was covered with the cold, white powder, and the broken-off stems and stalks of what had been a forest stuck up nakedly. Shattered pieces of them, buried under the white powder, slashed his walking flippers and blue stains marked his path.

Chier-cuala tried to pull himself up the steep slope by grasping the upright stalks in his prehensile, paddle-like forepaws. The stalks broke. He fell back—rolled downhill in a whirl of the white powder. It got into his fur. It was wet and cold.

He lay where he stopped rolling. He whimpered, too weary to move. Finally, knowing he must move and making the effort, he struggled up and went on. He did not try to grasp the stalks again.

At last, he found a way to the hilltop. The wind blew more fiercely up there. It slashed through his fur and chilled his body. He cried softly, miserably. His walking flippers were full of pain—turning numb. The blue

stains in his footprints grew large. Clumsily, he stumbled across the hilltop toward the place of the odd creatures.

He whacked a forepaw against the flat thing that blocked the entrance. It did not move. He slapped again, and then again and again, harder and harder. He uttered a broken heart-forsaken cry. He could not understand why the odd creatures did not take away the entrance-block and give him food.

He had to have food. He was hungry.

The cold wind screamed.

Chier-cuala slapped the door and sobbed.

I.

THEY called it coffee, even though it was brewed from the stems of a plant which originated forty light-years from Earth. It had a citric, quinine-like taste. Hot and sweetened, it served the same function as coffee. Some people even preferred it.

It was an odd hour; Sigurd Muller and Loren Estanzio were alone in the commissary. Muller sipped from his cup—it was too hot yet. He set it down.

"What do you think about it?" he asked the younger man.

Estanzio made an awkward, unconvincing shrug. "It sort of scares me," he admitted.

"Yeah?" Muller said. He leaned his weight on the table. "Why?"

The young man was embarrassed. "Well," he explained, "you remember last year, just after I got here, you put me through the test sequence—the same one you use on the floppers?"

Muller smiled. "I put all you young squirts through it. You're supposed to be smart, or you wouldn't get to come here. It's good calibration standard."

Estanzio nodded. "I didn't do so good," he said.

"You did average," Muller recalled, as if it was an unimportant matter. He tapped a fingernail on the table top. "The trick with an intelligence test, you've got to make it tougher than the smartest guy to take it. Otherwise, it's a no good test." He slouched back and half-closed his eyes. "In the seven years I've been here, the average intelligence of the scientist-candidates that come here hasn't gone up an inch. I guess you kids have reached an evolutionary plateau."

"That's the thing that scares me," Estanzio confessed. "I mean, I knew all about mazes and problems, but the set you've got had me stopped. And when I saw that flopper catch on to the pattern maze—when it didn't even know the principle of a maze . . ." He hesitated. "I'm scared," he repeated lamely.

"It was a smart one, all right," Muller said.

Estanzio wasn't ready to go quite that far. "It could have been a fluke," he suggested.

Muller shook his head. "No fluke," he said. He leaned closer. "What if I told you the one we had today wasn't the first?"

Estanzio frowned. "I hadn't heard of any others," he said doubtfully.

"And I know there haven't been any since I've been here."

"You've just been here a year," Muller reminded him. "I had two the year before you came. They both came from the same place—the same place this one came from."

"Ziggurat Mountain?"

"Yeah," Muller said. "An enclave shut up in the mountains with no way out and a population of about seven and a half thousand. It used to be six thousand—it's been going up the last ten years."

Estanzio thought about that for a while. Idly, he turned the handle of his coffee cup one way, then the other. "Just the sort of place we could expect it to happen," he said finally.

Muller nodded, smiling. "Now tell me why."

"Well, it's a small population in a limited area—isolated—and they're under extreme selection pressure. It's the sort of situation that's almost sure to show an evolutionary trend."

"You got that out of Houterman's book," Muller told him.

Estanzio flushed. "Sure," he admitted. "But he's right, isn't he?"

Muller shrugged. "It's the same basic principle," he agreed. "But he wasn't talking about the setup here. He was talking about evolution by genetic drift—where the genes already exist. That's not what's happening here."

"Are you sure?" Estanzio asked hesitantly.

"Yeah," Muller stated. "We've had this station here ever since the planet switched from Alpha to Beta—that's close to a thousand years. We've been testing floppers all that time. If the genes had been around back then, they'd've shown up in the first couple of centuries. They didn't. The first flopper that showed up even halfway intelligent—don't scowl like that, I've checked the records—was just forty years ago. And guess where he came from."

"Ziggurat Mountain?" Estanzio guessed.

Muller rapped a fist on the table. "Right," he said through his teeth. "It's a mutation. It's got to be. And it happened right there in the enclave."

Estanzio was silent a moment. "Why did you kill it?" he asked.

"Same reason I killed the other two," Muller said. "I want a look at it's brain. The first two—I thought they were flukes. Now I don't think so—and a look at this one's brain cells will prove it."

"But wasn't that against the rules?" Estanzio wondered. "I mean, a flopper showing exceptional characteristics . . ."

Muller scratched his satanic beard. "So it was against the rules," he said contemptuously. "I had to find out, and that's the only way."

Abruptly, then, he changed the subject—or seemed to. "You go back with the supply ship, don't you?"

It wasn't really much of a question. Only a very unusual scientist-candidate stayed more than one year. Estanzio nodded.

Muller smiled, satisfied. "O.K.," he said. "When you get back, you can talk about this all you want. But while you're still here . . . it didn't happen. None of it. Understand?"

"I . . . I think so," Estanzio said slowly. "But . . . why?"

"Because they're getting smart," Muller told him. "If we don't do something, they'll all get smart—smarter than we are. And they're vicious—you've seen what the wild ones are like. Well, we can't let it happen. That's

why we've had this station here all these years—to watch 'em, because someone way back then figured this might happen. So we can stop 'em, if it does. But there's just enough softheads around here that *want* it to happen. We don't want them finding out—or anybody else."

"Oh," Estanzio said. He frowned helplessly. "But what can we do? How can we stop them?"

"Don't ask," Muller chuckled. "I might tell you."

"Well, I'd like to know," Estanzio said.

Muller leaned his weight on the table. He tapped the hard surface confidentially. "You heard who's coming in the supply ship this time?"

Estanzio paused, trying to remember. "Well, there's Blackett, and Holman, and . . ."

Muller waved a hand. "I don't mean personnel. I mean just for a look around."

"Hitchcock?" Estanzio wondered incredulously. "But he's . . . He'd be on *their* side. He always is."

"He might be," Muller admitted, "if he knew what he was doing. Most of the time, he just meddles. That's what he's going to do here."

"Are you sure?"

"Yeah. I'm sure," Muller said, smiling. "I'm going to help him."

He laughed.

"I was horrified, gentlemen. Horrified."

That, Adam Hitchcock decided, was the thing to say about Xi Scorpii when he got back to Earth. That was what he would tell his Society for Humane Practices, to signal the beginning of a new crusade.

The Xi Scorpii Foundation would protest, of course. They would say he was misrepresenting the facts. But that didn't worry him. Men always said that when he exposed their iniquities, and it never made the slightest difference. The public always recognized the truth.

Hitchcock made his decision as soon as he arrived at Xi Scorpii—while he was still descending the stairway scaffold that huddled close up against the *Wayfarer's* flank. His mood was surly—it had been a bad trip out. The *Wayfarer* was a cargo ship, with only minimal provision for passengers; he had been obliged to share his cabin with a young scientist-candidate whose single-minded enthusiasm for the mutational aspects of genetic chemistry left him with a very unflattering picture of the scientific mind.

Carrying a piece of luggage in each hand, Hitchcock trudged down the stairs. It was a long way down, and the scaffold felt rickety. It trembled and creaked in the wind.

Any civilized place would have had an elevator.

The wind was cold. It howled around him. It chilled his throat. It penetrated through the thin overcoat he wore—a coat which was all he'd have needed on any civilized planet. His ash-gray hair was tangled. His ears tingled painfully. His jowls were numb. His head ached and his nostrils watered. It was a dreadful planet.

He paused on the stairway and set down his bags. He tried to draw his collar tight. It was no use—the cold air continued to ooze through. Grimly, he started down again. His camera, on its loop over his shoulder, bumped against his side.

The landing field toward which he descended would not have done justice to a survey camp. It was nothing but a leveled-off rock plain without pavement, no larger than a city block. Various atmosphere craft crowded the edge of the field on the side nearest the outpost's black dome. On the other side, a cold sea spread all the way to the edge of the sky. Sluggish, floe-choked waves smashed on the rocks, building castles of ice with their spray.

Critically, Hitchcock glanced toward the bright sun. It burned in a blue, clear sky, but it gave no warmth. Nor was the system's other star more than a fleck of light down close to the ice-dappled sea.

Definitely, this planet wasn't fit for anything to live on—neither man nor any other creature.

Already, he saw as he continued his descent, the ship was disgorging its cargo. Its hoist settled massive crates and bundles of supplies on sledges which were dragged toward the dome by harnessed teams of shaggy, dirty-white, short-legged creatures about the size of very large dogs. At rest, while waiting for their sleds to be loaded, they squatted on their hind legs, their apparently boneless arms curled up almost double and their mittenlike paws pressed flat against their bodies. No one was directing them. They seemed to know what to do.

Halfway down the scaffold, Hitchcock stopped again. He turned to the man behind him and pointed at the laboring creatures. "Are those the natives?" he asked. He had to shout to be heard above the howl of the wind.

The man—another of those eager young scientist-candidates—didn't seem to understand the question. "The floppers?" he wondered uncertainly, then nodded.

Hitchcock unlimbered his camera and put the scene on tape.

It was an outrage!

The poor things were slaves!

When he reached the bottom, a man in a thick, hooded garment was waiting beside a sled with removable benches set on it. Its eight-flopper team squatted stoically, cringing from the frigid wind. The man reached out to take Hitchcock's luggage. "Climb aboard," he invited loudly. "We'll be heading for the dome in a minute, as soon as the rest of you get down."

Hitchcock didn't let go of his bags. He glanced at the harnessed floppers. "Thank you," he said stiffly—and his teeth rattled with the cold. "I prefer to walk."

The man shrugged, but he looked concerned. "It's a long way to hike in this wind," he advised, nodding toward the dome a half mile away. "The first thing you know, you've took a deep breath, and then you've got frost in your lungs. Better ride along with the rest of us peasants."

"If they have to pull me, I will not ride," Hitchcock insisted staunchly.

"Who—the floppers?" the man wondered incredulously. "They grew up in this weather. They eat it for breakfast."

"They didn't grow up to be slaves," Hitchcock retorted.

The man looked at him queerly. "You must be this Hitchcock we heard about," he said. "Listen, mister—somewhere you've got the idea these floppers are people. They're not. They're just smart animals."

"No creature in the universe was ever born to be a slave," Hitchcock intoned.

The man made an exasperated noise. "Just take my word for it. If you walk, you'll wish you hadn't. Now climb aboard. We're ready to move."

He jerked an imperative thumb at the sled. Hitchcock eyed him for a long, stubborn moment.

Then the cold and the wind persuaded him. He went to the rear of the sled and put his baggage in the rack, all the time stamping his feet to put warmth in them. His hands were numb and blue. Shivering, he told himself the creatures could endure the climate better than himself, and that they would drag the sled whether he rode it or not. He would not add much to their burden.

But he hadn't forgotten his mission. He raised his camera and taped the scene—first the sled and its load of huddled, windlashed passengers—then swung the lens forward to the floppers waiting mutely in their harnesses. They had a sad, downtrodden look. Hitchcock let his camera dwell on them.

Unfortunately, they were ugly as sin.

He demanded quarters of his own, and got them. Coldly, he rejected the suggestion that a flopper could carry his luggage. Lordly, austere, he strode along the corridor to his room.

When he got there, a flopper was inside. With single-minded concentration, it went on sweeping while Hitchcock laid his bags on the bed. For all the sign it gave, it might not have noticed his entrance.

It would have been as tall as Hitchcock, but its legs were too short. Its pelt was silvery gray. Its head was revolting—a slab-shaped, almost neckless thing set on top of a shoulderless body. The big, googling eyes were placed far apart, leaving space for the big lipless mandible-jaws in between them. On top, the single ear stood up like the peak of a much-too-small cowl.

The rest of the creature was equally hideous—the flexible arms as seemingly boneless as a fire-hose, and the flat, big, floppy feet. It was marsupial, with a pendulous pouch that pulsed spasmodically, as if something alive was inside. But the creature was also unquestionably—almost indecently—masculine. It had a musky smell. Hitchcock stared at it with sick distaste.

It continued to work the broom with brainless absorption. It swept around Hitchcock's feet as if he was a piece of furniture.

"Stop that!" Hitchcock commanded offensively.

The flopper stopped. Looking up at him dumbly, it rolled its bulbous brown eyes.

"Get out of here!" Hitchcock told it.

The flopper just looked at him, dumb and trembling. Tentatively, it started sweeping again.

"No! Get out!" Hitchcock yelled.

Frantically, the flopper went on sweeping. It tried to work too fast. The broom flew out of its flipperlike hands and whacked Hitchcock's knee. Hitchcock yowled with pain and rage.

The creature fled, bounding out the door on all fours. Hitchcock grabbed the broom and chased it as far as the hall. He caught only a glimpse of it as it disappeared around a corner.

Slamming the door, Hitchcock went back and sat on the bed. He rolled

down his hose to inspect his whacked knee. It was an angry red, but not damaged.

The stupid brute!

Someone knocked on the door. Hitchcock pulled up the hose and refastened the top to his undershorts. Smoothing down his tunic skirt, he said, "You may enter."

A slovenly dressed man came in—ankle socks, ill-fitting kilt, and turtle-neck. He had a full, untrimmed, black beard. "What's the ruckus in here?" he asked.

"Ruckus?" Hitchcock repeated incredulously. "Here?"

"Yeah. Here," the man insisted. "One of my cleaning boys skedaddled out of this hallway and dove in his hutch like a carload of hell was looking for him. He'd cleaned up this far, so he must've been here." He glanced down at his feet. "That's his broom." He picked it up.

"I told it to leave," Hitchcock said. "I refuse to be a party to its slavery."

"Exactly how did you say it?" the man asked intently.

"I asked it please to get out of here," Hitchcock stated primly. "I must say the creature was unpardonably stupid. I had to repeat it twice."

The bearded man looked skeptical, but didn't challenge the assertion. "That's not in his vocabulary," he told Hitchcock. "You're new here, so I guess it isn't your fault. But after this, if you want a flopper to scram, say, 'That's all,' and he'll get right out. They're real obedient if you're proper with 'em. But you got to give 'em the right commands."

"I'll keep my own room clean," Hitchcock announced frigidly. "Keep your slaves out of here."

"If you want 'em to stay out, bolt the door," the bearded man advised. "It'll worry the boy to have his routine monkeyed with, but it's better than scuttle his training."

"Keep them away from me," Hitchcock repeated insistently.

The man looked him up and down. His eyes were steady. "Don't expect 'em to understand everything you say," he said finally. "They don't."

He backed out of the room and shut the door.

Mindful of his banged knee, still seething, Hitchcock rummaged in his bags for the liniment tube he always carried. He most certainly *would* keep his door locked. The mere thought of that mindless creature pawing his possessions made him tremble with rage.

It was terrible, the indignities a man of good will was forced to endure!

II.

"I hope your room is satisfactory," Ben Reese said as they began Hitchcock's tour of the outpost. He was a plump man, Ben Reese—almost forty, with a round face and an almost bald scalp. Hitchcock worried him.

"Adequate," Hitchcock replied. He had a nerve-rattling way of walking—never looking where they went. Constantly, he twisted his head in one direction, then another. "Spartan, but adequate."

"We don't have many luxuries here," Reese admitted. "Everything we have has to come in the supply ship."

"Um-m-m," Hitchcock muttered. "Tell me, Mr. Reese—what is it like to be the undisputed monarch of an entire solar system?"

Shocked speechless, Reese stopped in his tracks and stared at the man. "I don't think you understand," he managed finally.

Hitchcock walked loftily onward. Reese had to run to catch up.

"All I do is . . . is co-ordinate our research work here," he explained, a little breathless. "And . . . and I estimate our supply needs. The ship only comes once a year—someone has to do it."

But Hitchcock's attention was on something else. Maybe he was deaf—he didn't seem to have heard.

They followed the dome's main hall. Their buskinned feet whispered softly on the tiles. Only a few people passed them. In the dim light, the near silence, it was like the cellars under a castle. Floppers intent on their tasks scurried past like industrious gnomes.

At the hall's end, where it split into two out-curving corridors, Reese paused. "Would you rather see the anatomy lab first?" he proposed. "Or the biochemical department?"

Hitchcock didn't reply. Not far up one of the corridors, a flopper was belaboring the floor with a mop. A sloppy bucket sloshed by its feet. With an almost expressionless look of glee, Hitchcock turned his camera on it.

The flopper worked on, oblivious of them. After a long moment, Hitchcock stopped his camera and turned. "You said something?" he inquired.

"I asked what you wanted to see first," Reese said.

Hitchcock glanced down at him as if he were a bug. "It makes absolutely no difference," he assured Reese. "Before I am done here, I will expect to have seen everything."

They went on with the tour. For Reese, it was an endless trial. Hitchcock listened only to the things he cared to hear, and trained his camera on every laboring flopper they passed.

Reese endured it as long as he could. He had no illusions why Hitchcock had come to Xi Scorprii—the man was convinced the floppers were victims of human oppression, and planned to expose it. He and his Society for Humane Practices had already done something like that on a score of other planets, completely disregarding the actual facts. Reese had hopes he could persuade the man to leave Xi Scorprii alone, but he lacked the faintest idea of how he could do it.

Finally, when Hitchcock unlimbered his camera at the sight of a flopper washing dishes in the commissary, he thought he saw his chance.

"Why are you doing that?" he demanded.

"I am gathering evidence," Hitchcock replied. He held his whirring camera steady, not looking at Reese. "When I return home, I intend to see this outrage stopped."

Reese was nonplussed. Even knowing Hitchcock's intentions, he could not imagine what the man was talking about.

"I will not stand still and see any person enslaved," Hitchcock stated.

So that was it. "But . . . they're *animals*," Reese explained. "We've trained them to do these jobs because we don't have enough people here to do them. They . . . they're just domesticated animals."

Hitchcock put up his camera and turned. "Do you ask me to deny the evidence of my own eyes?" he demanded. "I see this one washing dishes, and you tell me it's only an animal?"

"Why not," Reese wondered softly. "It's a . . . a rather intelligent animal,

of course—somewhat more advanced than, say, the terrestrial chimpanzee. But that still leaves it far below the human level. Are . . . are you against using animals to take the burden of work off a man's shoulders?"

Hitchcock said succinctly: "Let us continue our tour."

He walked off, forcing Reese to tag after him. They were out in the corridor again when Hitchcock said, his voice scathing, "I was advised that the welfare of the natives was being neglected, but—"

"Who told you that?" Reese wondered blankly.

Hitchcock was impatient. "It's common knowledge on every civilized planet," he stated.

"But it . . . it's not true!" Reese protested. "You can't even properly call them natives. They're only animals—in fact, rather primitive animals in most respects. They do have fairly well developed brains—that is, we can teach them some reasonably complicated things, and they have moderately good judgment—but they haven't any abstract reasoning power, or the ability to symbolize, or . . . or social instinct—none of the things that make people human."

"I came here," Hitchcock replied, "to judge that for myself. I have heard excuses like yours on other planets I've visited—planets where the most outrageous violations of decency were practiced. Why, can you imagine—on Epsilon Eridani they were actually *eating* them! As for conditions here, I will come to my own conclusions."

He paused then, slowed his stride, and turned to Reese. "Well, where do we go now?"

Originally, Reese had planned for them to continue along the corridor. The microfilm reference library would have been next. But now, suddenly, he changed his mind. He nodded across the corridor toward a spiral stairwell.

"Down there," he said.

As they clambered down the narrow, steep stairs—Reese going first—Reese said, "So far, you've only seen floppers who were born here—I mean, here in the dome. You see, when this"—he gestured inclusively around himself—"was being built, they were brought in for study, to set a standard we could guide our work by. They've been here ever since. We've let them breed without any control, and they haven't been under the selection pressure the ones outside have been under, so they still ought to be almost identical to their ancestors. That makes them a good comparison-standard against the floppers outside."

They emerged from the stairway into a corridor that looked very much like the one they'd left. Reese led Hitchcock into a side corridor which ended at a double-doored threshold. Passing through, they walked out onto a gallery overlooking a roomful of partitioned cubicles on the floor below. Most of the cubicles had floppers in them.

"These are wild floppers we've brought in to examine," Reese explained.

Hitchcock crossed to the rail and aimed his camera downward. "They are no different from the others," he declared truculently. "Must you keep them in solitary confinement? It's inhuman!"

"But it's not like that at all," Reese tried to explain. "They come from different geographical areas, and we put them back when we're done with

them. We have to keep them apart to prevent them from breeding. Besides, they might kill each other."

The sound of their voices had made the floppers look upward. Their lipless, fleshless jawbones clashed slaveringly. Hitchcock moved his camera back and forth across their upturned, bloodlusting faces.

"I want you to see something," Reese said. He crossed to a cold locker recessed in the wall and took out a large haunch of meat. It was a hideous blue-green color, and a translucent, cartilaginous length of bone protruded from it.

"Watch," he told Hitchcock.

Hitchcock was horrified. "You're going to feed them *that*?" he demanded. "But it's putrescent!"

"Oh, no," Reese assured him, earnestly shaking his head. "That's its natural color." He did not add that it came from a domesticated flopper which had died; Hitchcock would have claimed he was promoting cannibalism. Crossing to the rail, he dropped the haunch into one of the pens directly below.

The flopper grabbed it before it hit the floor—grabbed it between its flexible paws and crammed it against its maw. It masticated the meat, bone and all, with its toothless, bare-bone jaws. It worked the meat to a messy pulp and sucked it inward, its throat pulsing hideously.

When they saw the meat dropped, the floppers in the surrounding pens tried to get to it—tried to leap and climb out of their prisons, but the pen walls were too smooth and high. Blind-stubborn, they kept on trying, slamming their bodies again and again against the partitions. They yelped crazily. The room was full of thunder, rasping screams, and screechings.

Through it all, with wild looks of apprehension, the favored one suckled and gobbled at the haunch. Its lipless mouth worked greedily. Trickle of blue-stained drool oozed down its front. In a remarkably short time, the haunch was gone without a trace.

The other floppers were still trying to reach the pen where they had seen the haunch fall. And now, gorged and still drooling, the flopper in that pen was trying to get out, too. It leaped and fell back, leaped and fell back, time after time—its goggling brown eyes turned upward, its appetite whetted. Involuntarily, Hitchcock flinched back from its ferocity, then bent eagerly forward so his camera could witness its rage. The crazed creature's hacking cries were swallowed in the general tumult.

Hitchcock stopped his camera, finally, and turned. He shouted something. The noise smothered his words. Reese gestured to the door. He led Hitchcock outside.

When the door closed behind them, shutting off the ear-blasting noise, Hitchcock turned on Reese.

"They seem to hate you," he observed. "Don't you feed them?"

"We fed them not more than an hour ago," Reese said, with a glance at his watch. "They didn't behave with much intelligence, did they?"

"Hm-m-m," Hitchcock growled. "A starving man would act that way."

"But these . . . they weren't starved," Reese argued. "They were probably half-starved when they were captured, of course, but they've been fed since then—most of them several times."

"I cannot believe that," Hitchcock retorted. "Those creatures were *starved*."

Reese shook his head. "Their reaction was pure habit," he said. "Food is scarce for them. It's been scarce all their lives. Their . . . their ravenousness is natural for them."

With a look of scornful pleasure on his face, Hitchcock pounced. "And why, may I ask, do you permit them to starve?"

It came to Reese that he had made a mistake. In trying to win a small argument, he had given Hitchcock support for a much more serious—much more difficult argument.

"Why . . . why," he stammered. "We're scientists. We're here to . . . to *study* the floppers. It's our whole reason for being here. You see . . . you see, we believe the floppers stand a very good chance of developing human-level intelligence. We've been watching for signs of it for nearly a thousand years, now. And if we tried to make their lives any easier, it would interfere with their development."

"Nonsense," Hitchcock sniffed.

"It isn't nonsense," Reese persisted reasonably. "It's a logical conclusion based on the principle of natural selection. If you'd let me explain the situation here—"

"I am fully aware of the situation here," Hitchcock replied. "I consider it disgraceful."

Reese gritted his teeth. "This is an unusual planet," he said earnestly, hoping the man would pause and begin to doubt. "That is, its orbit is unusual."

"Well, certainly," Hitchcock said. "I would expect a planet in a double-star system to have a distorted orbit."

"It's worse than that," Reese persisted mildly. "When this system was explored the first time, this planet had an orbit around Alpha—it's still in the books as Alpha II. But now it's going around Beta."

"What?" Hitchcock boggled. "Preposterous."

"It's true," Reese said helplessly. "And not only that, we think Alpha and Beta have been passing it back and forth ever since it was formed. They have rather eccentric orbits around each other, you see, and they come rather close together every forty-five years. If the planet is in the right part of its orbit when they're closest together, the other star captures it."

"Does this happen very often?" Hitchcock asked sarcastically.

Reese made a helpless gesture. "It's different every time," he explained. "It might stay with one star for a hundred thousand years, or maybe just for a couple of hundred. Each time it's traded, it takes up a different orbit—that is, different from any it's ever had before. The next time it happens will be three and a half thousand years from now."

Hitchcock sniffed. "This is very interesting, if true," he said. "But it has nothing to do with the deplorable way you have treated the natives."

"It has everything to do with how we treat them," Reese insisted. "You see, every time the planet changed orbits, its climate has been drastically altered. We have a lot of geological evidence of that. I guess Alpha and Beta are more similar than most binary pairs, but there's still quite a

difference in their radiation. And the various orbits the planet took put it at different distances out from them."

"I presume this has some significance," Hitchcock interrupted testily.

Reese nodded. "We're almost certain that the living things on this planet can endure great extremes of climate—if they couldn't, they'd have died out long ago. It's even possible that life here was wiped out completely by some of the changes—it might have happened hundreds of times before the cycle we're seeing now got started. I don't suppose we'll ever know for sure."

Hitchcock looked down at him with a fastidious expression on his face. "Never have I heard such a preposterous idea," he declared. "As if the spark of life could be snapped off and on like an electric lamp."

Reese had heard of people who thought like that, but he had never met one before. It was like meeting something out of the dark ages. "I was trying to emphasize how . . . how hardy the life-forms on this planet must be," he explained diplomatically. "How . . . how *adaptable*. We think they have the capacity to evolve hundreds of times faster than on any other planet. So you see, being here is a wonderful opportunity to see evolution at work. And—"

"You have not yet explained," Hitchcock reminded him again, "why you have neglected the welfare of the natives here . . . why you vivisect them, and—"

So he was back where he started, Reese thought. It was discouraging. "Why, I thought it was obvious," he explained. "The floppers aren't really intelligent—yet. But they do have the . . . the potential to *become* intelligent. It's really almost inevitable in a situation like this—that is, with an unpredictably erratic environment, intelligence is almost certain to develop sometime, because intelligence is the one specialization that gives an animal the ability to live in a whole lot of different environments. You see, we're not just studying the evolution process here—we're . . . we're watching the development of intellect. Sooner or later, somewhere on this planet, the floppers are almost certain to become . . . to become *intelligent*. I mean, intelligent the way a . . . a human being is intelligent. And we want to be here. We want to see it happen. We've never had the chance to see it happen in an animal before."

Hitchcock scowled. "You speak as if men were animals," he criticized. "As if an animal could have a mind."

"Well, human beings are a form of animal," Reese pointed out.

"That," Hitchcock snapped, "is nonsense. Dangerous nonsense. I want to hear no more of it." He hitched up his camera's shoulder strap. "As for this matter of intellect, I have only your word they are not intelligent right now. I will have to have proof, Mr. Reese. I must have proof."

Ben Reese gave up. He could not prove a thing to a man who refused to believe.

INTERLUDE

It was a good time to hunt. No wind blew loose snow on the screecher's tracks, blotting them. No mistiness obscured the distance, and the sky's light shimmered on the white land. Qua-orellee kept his eyes tightly lidded to lessen the glare.

The tracks were new. The beast could not be very far ahead. Qua-orellee loped along, following them, but he stayed well aside of the trail for fear the snow would open under him like a mouth and devour him.

He had seen it happen, once. He and some other people were following the tracks of a bushy-tailed runner, and one of the people went close to the creature's trail. A hole opened under him and he was gone. Qua-orellee and the other people fled instantly. Since that time, Qua-orellee had never gone closer than three body-lengths to any creature's trail—not even his own.

The screecher's tracks vanished over the crest of a rise. Qua-orellee veered away from the trail, to reach the crest well away from where the screecher had been. It was hard to climb the slope with only his rear legs. He dropped down and hobbled along using one of his front limbs. In the flipperlike hand of the other, he clutched his rock.

His rock was a treasure—his only possession. He would need it when he came upon the screecher and had to kill it. It was hard to find a rock of a good shape and size for killing beasts with, but a rock was wonderfully better than ice. Ice broke easily. It didn't keep its shape. And, too, it took a much stronger blow to kill with it.

He never let the rock out of his sight, and rarely out of his hand. He clasped it to him when he slept, and he slept in his own secret place. Any other of the people would eagerly kill him—if they dared to try—to possess that rock.

He topped the rise. Below him, the screecher's trail turned down along the valley, away from him. Qua-orellee let out a high, hacking cry, to tell the people who had joined him in the hunt that the screecher had turned in a new direction. Shrill, rasping calls came back from either side of him, repeating the news. Then another cry came from down-valley—the beast had been seen.

Qua-orellee clutched his rock against him and plunged eagerly down the slope. His big, flipper-foot and short legs made him stumble. He rolled all the way to the bottom in a cloud of snow, but he didn't let go of his rock. No matter what happened, he would never let go of his rock.

He stood up and shook the snow out of his fur. Up-valley, two more people—not encumbered with rocks—were bounding down the hillside on all fours. They continued across the valley and up the other slope. When they reached the crest, they headed toward where the screecher had been seen. Qua-orellee stayed in the trough of the valley. He followed the trail.

The valley curved around the bulk of a massive, steep hill. As he rounded the turn, Qua-orellee saw the screecher far ahead. Three people up on the ridge had gotten abreast of the beast, and one of them was lolloping down into the valley to head it off. On the ridge on the other side of the valley, the two who had crossed over were rapidly catching up, running on all fours. Qua-orellee was far behind. He hurried as fast as he could on his short legs and large feet.

The other people closed down into the trough of the valley, forming a wide-spaced crescent-circle line in front of the screecher. They had picked up chunks of ice and ice-spears. They confronted the beast.

The screecher stopped. It hunched down, as if to leap. They advanced toward it, ice weapons brandished. For a long moment, the screecher did

not move. Then, with a snarl, it turned and retreated up the valley toward Qua-orellee.

Qua-orellee rushed to meet it. It saw him and veered away—started up the side of the valley. One of the people, galloping along in pursuit, headed it off. It swung back down into the valley, toward Qua-orellee. Qua-orellee stopped and stood erect, holding his rock high above him in both hands.

The beast charged. Its muscles pulsed and slackened rhythmically. It screamed its rage and savagery. Unflinching, Qua-orellee tensed himself to smash his rock down on the beast's skull. He watched the beast surge toward him, screeching.

Fearlessly, he waited.

III.

Ahead, the land loomed in the cold mist, a high mass of darkness rising out of the gray, frosty sea. Hitchcock cringed from it as it rushed overwhelmingly toward him, but then the pilot sent the skimmer sailing toward the crest. Hitchcock looked down dizzily at the crumbling ice-crusting cliff. Sudden gusts of wind slammed into the small craft. It bucked and jolted, and the pilot fought silently. The engine surged.

Then they were over the land. The winds fell away. Hitchcock saw spread before him a desolate plain of ice and crumbling stone, and beyond, towering high, the white mountains.

But not one living thing.

The pilot twisted around and looked to the man in the midship seat. "Want to check the traps?" he asked. His parka hood was pushed back, and the wind mask dangled from his throat like a bib.

"Yeah," Muller said. He had a snarling voice. "Check 'em. He—" He meant Hitchcock. "He wants to see how we work—that's part of it. But they won't have caught anything."

The pilot nodded, shrugged, and turned front again. The skimmer leaped forward.

Hitchcock lifted his camera. The utter lifelessness of the rock-littered plain was oppressive. It was something the people back home ought to see. This scene, more than any words he could say to them, would impress on them how dreadful Xi Scorpui was.

Muller twisted around to face him. Reluctantly, Hitchcock put down the camera and waited for him to speak.

"We'll see if our traps 've caught anything," Muller said. "If they haven't, we'll have to go catch our own."

"What? Do you hunt them?" Hitchcock demanded. The mere idea was appalling.

"We got to get specimens somehow," Muller told him.

The skimmer settled down close to the ground and streaked over the plain. The weathered boulders sprawled kaleidoscopically across their path, momentarily slashing at them, then vanished in the distance behind. Ahead, the glacier-choked mountains rose sharply into high, wispy clouds.

"How's it look?" Muller asked. "Pretty bare, huh?" He chuckled. "Wait a couple of months. Right now, it's the tail end of summer."

"Summer?" Hitchcock wondered incredulously. Here and there, a few hardy plants dug their roots into chinks in the rock, clinging to existence.

Their segmented limbs and stems were frost-burst and coated with rime. Their fleshy, gray-green spines were spread in plaintive supplication to the distant sun.

Tentatively, Hitchcock raised his camera.

"Yeah, summer," Muller repeated. "We get about a whole year of it—one out of four. We're closer to the sun, then. Sometimes the temperature gets up as high as fifteen, here in the tropics—sometimes for weeks at a stretch."

"Only fifteen?" Hitchcock gestured at the rock-strewn, snowless plain. "Why isn't the snow—?"

"Fifteen centigrade," Muller explained shortly. "But it just thaws out close to the ocean. The other side of these mountains, there's plenty of snow. You'll see."

The mountains bulked massively over them. The snow-sheathed slopes and bare rock cliffs reared steeply upward like a titan's wall. For several minutes, the skimmer cruised along that wall, then swung directly toward it where a glacier oozed from a narrow valley and poured down onto the plain.

The glacier's front was like a cliff, sheer and awesome, leaning outward. Berg-sized fragments, broken from it, lay in rubble at its feet. Engine snarling, the skimmer rose before the pebble-pocked wall.

Strong, battering bursts of wind hit the craft as it cleared the edge. Its engine screamed as it forced its way forward into the cold air flowing down from the mountains. Yawning fissures and dark, rippling veins of embedded pebbles streaked past beneath them.

Hitchcock lifted his camera again. The glacier imprinted itself on his tape. "Where are we going?" he asked.

"The other side of the mountains," Muller said. "Where the floppers are."

Hitchcock looked up at the mountains. The valley had curved. Mountains rose skyward all around them.

"But aren't floppers—" How he hated that silly word! "Don't floppers live back there?"

"Not many," Muller said. "That section of coast is cut off from the rest, and there's nothing to live on in winter. Mostly, they stick to the snow country."

"But . . . snow country?" It sounded ominous. "How can they live?"

"They get along," Muller said.

The glacier swelled upward steeply where it squeezed between two mountain shoulders. The skimmer sailed loftily over the crest—flew onward into the heart of the mountains.

"How?" Hitchcock wanted to know. "What do they live on?"

"They take in each other's wash," Muller said.

"I don't understand," Hitchcock said blankly.

"They gnaw each other's bones. Put it that way," Muller told him.

The skimmer descended from the mountains to a land of low hills smothered in snow. The sky was cloudlessly blue, and sunlight shimmered blindingly on the frozen, white wasteland. Hitchcock adjusted his camera to minimum sensitivity, to compensate for the glare.

"There it is," Muller said. "Flopper country."



Hitchcock thought of a baron showing off his domain from a castle's wall.

"Where are they?" he asked.

Muller snorted. "Oh, they're out there. But it's a lot of land, and not many floppers. Our last census put it at about one for every twenty square miles. And without a body heat spotter, half the time you don't see 'em." He handed Hitchcock a pair of sun goggles.

The skimmer struck out across the rolling land. It stayed high over the hills. "The traps don't signal," the pilot announced. "Check 'em anyway?"

"Naw. Skip it," Muller grumbled. "Just waste our time."

He twisted around to speak to Hitchcock. "Traps don't catch much, these days," he said. "They're getting too smart to get caught."

"Oh?" Hitchcock asked, interested.

"We use pit traps," Muller explained. "Any other kind 'd be no good in this kind of country. They caught a lot of 'em, a couple hundred years ago. Not any more."

"I see," Hitchcock said. He was almost delighted. At least the poor creatures weren't completely at the mercy of these men.

"You know what I think?" Muller confided. "I think all we ever caught was dumb ones—the smart ones knew enough not to get caught. Now the dumb ones 've died out—there's nothing but smart ones left. So we don't catch 'em. Not with traps, anyhow."

"But you catch them?" Hitchcock inferred.

"Yeah. Sometimes," Muller said. He called forward to the pilot. "Head for that place we found all the tracks last week. Maybe they'll still be around."

"How?" Hitchcock wanted to know. "How do you catch them?"

"You'll see," Muller answered. He rummaged in a compartment under his feet and brought out a net. He unfolded it and laid it in a long, narrow

roll on the cowling beside himself and Hitchcock, up against the cockpit's transparent canopy. He hooked lanyards from the exposed corners to grommets inside the cockpit, just under the rim.

"Dr. Muller," Hitchcock said, almost pleading, "haven't you done *anything* to help these poor creatures? Do you simply let them *live* in this horrible country? And starve? Freeze? Die—?"

"Why not?" Muller wondered. "They're just a bunch of animals."

"Why . . . why it's your human duty," Hitchcock protested, shuddering.

"Look," Muller said with a firm, inflexible patience. "We're scientists. We're here to study these critters—watch 'em and see if they evolve. If we tried to help 'em, we'd mess things up. We couldn't tell what happened naturally and what happened because we made it happen. Anyway, they aren't any worse off than if we hadn't discovered this planet."

"Dr. Muller," Hitchcock said, and there was condemnation in his tone, "you haven't one spark of humanity in you."

Muller laughed. "Good thing I don't, or I'd be no good here," he said. "Look, mister. These critters have it hard—they've got to live in this country, or they die. And if they live, it's because they've adapted. And if they adapt, it's because they're evolving. Do you want to get in the way of that? Do you?"

"It's indecent!" Hitchcock sputtered. "Criminal! You'd let these poor creatures die and . . . and suffer without lifting a hand! Why, they have the same right to live that you do. I will see them granted that right."

"Go ahead," Muller sneered. "Just don't interfere with our work. This here's the biggest research project in the universe."

"Tracks," the pilot reported.

Hitchcock looked out. Far below, a thin trail threaded across the crest of a low hill and down a steep slope. The skimmer paused and settled groundwards. The trail became the dragging tracks of a clumsy, struggling animal—the flattish footprints close-spaced and scuffed, as if the feet had not been lifted clear of the snow.

"It's a flopper, all right," Muller decided. "Cruise around—let's see if there's more."

The pilot kept them low. They followed the low ridge and crossed several more trails, all of them headed in the same direction. "Looks like a hunting pack to me," the pilot judged.

"That's what it is," Muller confirmed. And to Hitchcock, "They just started hunting like this about forty years ago. Most of 'em still hunt by themselves, but every once in a while we find signs of 'em working together—like this."

Hitchcock let his camera scan the pattern of tracks in the snow. "Is it significant?" he asked.

"Yeah," Muller said. "They're not gregarious critters. Like I said, most of 'em hunt by themselves. This is the first sign we've had of 'em getting together—they're developing a social sense."

"Civilization?" Hitchcock wondered, awed.

"It's the start of it," Muller said. "Right here."

The pilot had turned the skimmer to follow the hunting pack. Muller

pointed down at one of the trails in the snow. "That's the tracks of the thing they're after."

It looked very much like the other trails—slightly messier, with the footprints overlapping in a complicated pattern. Hitchcock gave his camera a long, careful look while the skimmer swept up the slope of the low hill and down the other side into the deep valley.

"It's just another sign they're turning smart," Muller said. "Them hunting in packs, I mean. That's evolution working. It takes a lot of brains to stay alive in a country like this."

"Do you mean to tell me," Hitchcock wondered, "that *this* is why you refuse to help them—so you can watch their desperate struggles? To . . . to satisfy your own curiosity?"

"Sure," Muller said. He sounded very satisfied with himself. "Can you think of a better reason? Besides, we may have to fight 'em some day. It'll be a good idea to know all we can about 'em."

"But what possible reason could we have for fighting these . . . these pitiful creatures?" Hitchcock protested.

"If they get smarter than we are," Muller told him, "we *better* fight 'em. And I've got lots of evidence they're going to."

That seemed to settle that. Hitchcock shuddered with horror. For the first time, he could understand Muller's attitude. It troubled him greatly, and he knew it was wrong. He was sure it was wrong. It had to be!

But he, too, was afraid.

The quarry's trail turned to follow the valley. The pilot banked the skimmer sharply to turn after it. "Those tracks look new," he observed.

"A couple of hours or less," Muller agreed. The skimmer rocketed down the valley. Hitchcock leaned forward, peering ahead. He held his camera ready to use.

"Are they very far ahead?" he asked.

"Hard to tell," Muller answered. "They can move pretty fast when they want to." He pointed to a set of tracks that paralleled the tracks of the quarry. "That boy was using three legs—sort of like an ape when it's running. They do that when they're in a hurry—or else all four."

"They run like *animals*?" Hitchcock demanded. He had a vision of the bumbling, shambling creatures bounding along on all four legs like beasts. The thought was appalling.

The skimmer skidded around the curve of a high, moundlike hill. And there they were. Still far ahead and indistinct in the sun-glare, they were nevertheless unmistakable. Floppers—eight or ten of them.

"Pull back," Muller snapped.

The skimmer bucked and shuddered as the pilot slammed it to a stop against the windblast of its fans. Quickly, they slipped back around the curve of the hill.

"Now you'll see how we do it," Muller told Hitchcock. "Better get buttoned up. It's cold out there." He helped Hitchcock with the unfamiliar clasps of his wind mask, and made sure his parka was zipped tight.

Then he got busy in his own part of the cockpit. Hitchcock leaned forward to see. When he had his own wind mask in place, and his parka was tight, Muller opened the canopy on the side where the net lay rolled on the cowl.

A blast of cold air burst into the cockpit. Hitchcock felt it even through his thick clothes. It leaked in through his mask and around the brow ridge of his goggles. Painfully, it invaded his nose as he breathed.

Muller pointed to the grommet near Hitchcock's knee, where the net was secured. "Is it tied down good?" he asked. His mask muffled his voice. Hitchcock glanced down negligently and nodded.

Not that he cared if it was tied down properly or not. It was revolting merely to think of using a net to capture a flopper. Such things were unfair—unsportsmanlike.

But Muller accepted the answer. "Let's go!" he barked.

The pilot leaned forward, pushing the control stick all the way front. The skimmer tilted forward. The engine surged.

They skittered around the curve of the hill, then straightened out and drove. Hitchcock felt the icy wind smash against him. Intense cold leaked through his parka's fastenings. The wind thundered around him. He raised his camera and focused it on the place far ahead where the floppers were gathered. The skimmer hurtled forward like a boat on the crest of a wave.

Muller held a set of binoculars up against his goggles, studying the scene ahead. "They got the thing surrounded," he announced. "One of 'em's got a—" He stopped. "Get that one!" he rapped out. "The first one we come to. He's the one we want!"

Hitchcock could make them out, now. A line of floppers was driving a sinuous, short-legged beast toward another flopper. That flopper was standing still, its back to the skimmer. It held something over its head with both of its flipperlike paws. The beast was gliding toward it like a snake.

"That's the one we want!" Muller yelled again into the icy wind.

Muller pushed the rolled net over the skimmer's side. It unrolled and flapped sluggishly in the wind. The skimmer rocked.

They were very close, now, and traveling fast. The wind roared around them—it beat at their clothes. A vast plume of wind-lifted snow blew up behind them. Hitchcock held his camera fixed on the flopper. The scene exploded into largeness before them.

At the last moment, the pilot spun the skimmer broadside, setting the net to scoop up the flopper. At that instant, Hitchcock reached down and wrenched the net's anchor cord from the grommet near his knee.

Because he was doing that, his camera did not record what followed. The net, robbed of half its support, bunched into a bundle which clubbed the flopper from behind and tumbled it into the snow. A large, ragged, heart-shaped rock flew from its paws.

The skimmer hurtled onward from its own momentum. The pilot fought to slow it down. Hitchcock raised his camera again.

He got what happened next on the tape—the catlike pounce of the beast, the desperate struggling of the flopper, and the sudden gush of incredible turquoise blood on the white snow.

"You see?" Hitchcock cried triumphantly. "You see? *That's* how you make them live! You murderers!"

IV.

It was days later that Hitchcock commanded Muller to show how he measured the floppers' intelligence.

Consistently, as his investigation progressed, he had heard their intelligence disparaged. It was a lie and a conspiracy, of course, but he was gradually forced to the realization that the ultimate success or failure of his mission would depend on whether he could turn up evidence to prove they were intelligent.

Muller smiled and took him into the laboratory.

At first, what he saw was not encouraging. The problem tests were fantastically simple. In fact, when he tried them, their solutions were practically obvious. But he did force Muller to concede that the floppers could do them, too.

"Yeah, they do 'em," Muller said sneeringly. "They do 'em almost as good as you do."

Then they came to some problems not so easy. Problems like the fire-moat, in which—to reach a scrap of food—the flopper had to cross a wide bed of flame-bright coals.

Baffled, Hitchcock paced back and forth along the edge, his hollow-jowled face made ruddy by the heat. There wasn't any way he could do it. No way at all. Finally, he gave up. He stopped and turned back to Muller. "This is impossible," he protested.

"Yeah?" Muller smiled. He walked over, picked up a mat from the floor, and threw it across the hot, eye-searing coals.

"How should I have known it was fireproof?" Hitchcock protested. He was using his camera again, recording the problem and its solution.

"How did you know it wasn't?" Muller answered. "You should have tried it, to find out."

"But you can't expect an . . . an untrained savage to think of *that*," Hitchcock argued.

Muller shrugged. "It's a tough trick, all right," he admitted. "But we've had a few floppers do it."

"Impossible," Hitchcock snapped.

"Not those floppers," Muller snorted. "They were *smart*."

"What?" Hitchcock wondered. He wasn't sure he'd heard right. "Not really!"

Muller shrugged and smiled. "We have had a few smart ones," he admitted.

Hitchcock paused, inwardly jubilant, but he pretended not to be especially impressed. Like a hunter catching sight of his prey, he decided to wait—to bide his time and hope that Muller, unsuspecting, would make further revelations.

The man had the proof he—Hitchcock—needed. That was all he had to know. Before he was done, that proof would be his.

There were more problems, most of them even more difficult. Hitchcock managed to solve very few of them, in spite of his heightened vigilance. Muller didn't explain how he expected floppers to solve them, when even a man was baffled. He just smiled.

Hitchcock used his camera to record the ones that stopped him. If the floppers were considered stupid on the basis of tests like these, it was good proof that they *were* intelligent.

Then they came to the maze problems. Hitchcock blundered through the

first few simple ones and came out pleased with his own accomplishment, but annoyed because he couldn't use them for evidence.

"Well, at least *these* are simple enough," he snapped.

"We just use those to give 'em an idea what a maze is," Muller told him. He conducted Hitchcock into another room, where a gigantic panel of signal lights covered a whole wall. He opened a door and motioned Hitchcock inside. Confidently, Hitchcock walked in.

The door clicked behind him. When he turned, there wasn't a sign of where the door had been.

An awful, trapped feeling seized him. He pounded on the wall and shouted. No one answered. The tunnels around him swallowed the sounds without an echo.

He started to run.

Half a minute later, out of breath, he stopped.

This wasn't like the other ones. This one was *hard*.

He looked around. Nothing looked familiar. He couldn't even be sure which way he'd come.

He was lost.

Appalled and fearful, he started to search. It was useless. The passageways branched and intersected endlessly. They curved and zigzagged and circled back on themselves. He lost all sense of direction—all sense of distance and time. Trying to trace back his steps, he took a wrong turn. Blank walls stopped him. A down-spiraling tunnel descended to a pool of black, utterly motionless water. Wearily, he turned around and climbed up again.

Then he stopped, breathing hard from the climb. The tunnel forked and other tunnels led off from it. Any one of them could be the right one. Or none of them. Blank-minded, frustrated, Hitchcock lifted his camera and slowly swung it in a full circle.

Let the people back home see this, he thought. Let them see the endless convolutions—the total formlessness of this maze. Let them judge for themselves how well it measured a person's intelligence.

And it was because of things like this they said the floppers were animal stupid! It was ridiculous. Why, even a man as intelligent as himself couldn't find his way through. The most brilliant man alive couldn't do it.

"Had enough, Hitchcock?" Muller's voice asked.

Startled, Hitchcock whirled. He was completely alone. "Where are you?" he demanded. "Show yourself."

"Had enough?" Muller asked again tauntingly.

The tunnels twisted around him crazily, shapelessly. A man was a fool to keep trying. He might spend days in this place. Why, he could starve! "Yes! YES!" Hitchcock cried. "Where are you?"

"Wait there," Muller told him. "I'll come get you."

Legs aching with fatigue, Hitchcock slouched against the smooth wall. Why, it was outrageous! The silly rabbit warren didn't even have a place to sit down!

Sigurd Muller came strolling along the passageway less than two minutes later. "How was it?" he asked, smiling raffishly.

Hitchcock straightened up. "How can you believe that this . . . this silly game gives the slightest indication of a person's intelligence? It's absolutely foolish."

Muller chuckled. "I don't know," he said easily. "It gave me a good look at yours."

Hitchcock sputtered. "Young man, no person could possibly find his way out."

"Yeah?" Muller wondered. "Follow me." He jerked a thumb over his shoulder, turned, and walked off in that direction.

"But you *know* the way out," Hitchcock protested. He had to scurry to catch up with Muller.

Muller didn't look back. "It isn't easy," he admitted, walking along almost jauntily. "But some people do it the first time through. We've even had some floppers do it."

"Chance," Hitchcock declared, breathing hard to match Muller's pace. "Pure chance."

Muller shook his head. "It wasn't chance," he said. He was very sure. "You don't get through a thing this tricky just with luck. Not fast, you don't. You either just hunt till you hit it, or you think up a method. If you hunt, you're a good long time getting out. But if you're real smart, you think up a method. Those floppers were smart."

"I was told," Hitchcock said pointedly, "that these natives are not intelligent."

"You were, huh?" Muller growled. He shrugged. "They must've been talking about the tame ones that do our muscle work for us. They *are* dumb. So are a lot of the wild ones, but there's been some smart ones, too. There's even been a few so smart none of these tests showed their limits. And let me tell you, that *is* smart. I get scared when I think about 'em."

Then, suddenly, they emerged from the maze. Hitchcock stopped and looked around. They were in the same room he had entered the maze from. The door he had gone through was there in the opposite wall.

"Want to try it again?" Muller asked.

"No thank you," Hitchcock snapped. "I've had quite enough of these childish games."

Wryly, carelessly, Muller smiled. "Anything else you want to see?"

"Yes," Hitchcock said firmly. "I want you to show me proof of these intelligent floppers."

Muller nodded cockily. "I figured you would," he said. "I got it all ready for you."

He led Hitchcock from the testing rooms to a small, file-jammed office. The files were a primitive type, as if the scientists here had never heard of memory crystals. Muller bent over the librarian's console and punched out a combination. A folder dropped into the delivery slot.

Muller passed it to Hitchcock, and motioned him to the desk. Hitchcock sat down and spread the folder's contents in front of him.

It wasn't an impressive display. The data-tables were meaningless. The multi-colored photo plates were nothing but abstract designs. Nevertheless, Hitchcock held his camera over them and recorded them slowly, page by page.

Then Muller's shadow fell across the desk. His finger prodded the stacked data pages. "This is how they went through the tests," he said. With a twist of the hand he fanned the sheets out and pulled free a set of seven pages.

He laid them on top of the others. "These are how a scientist candidate scored—I put 'em in to compare with."

Hitchcock separated the four sets of papers and laid them on the desk—the one of the scientist candidate and three containing the scores floppers had made. He tried to compare the records, glancing randomly from one set to another. But all four were confusingly similar, and the complex mass of numbers, plus and minus signs, and symbols meant nothing to him.

Muller brushed Hitchcock's hands out of the way. He traced a fingertip across the laid-out sequence of the scientist candidate's scores. Three-quarters of the way through the record, he paused.

"Up to here," he said, "he was even with 'em. They missed a few and he missed a few—they came out even. But from here on—"

His finger traced to the end of the record, then transferred to the corresponding section of the record of one of the floppers. Instantly, Hitchcock saw that the two were radically different.

"From here on," Muller continued, "they were way ahead of him—faster and slicker. They didn't miss hardly one. And those jobs were *tough*. Just to give you an idea—" He pointed to a spot not quite halfway through the test sequence. "Here's where *you* pegged out."

Astonished, Hitchcock looked down at the expanse of records. The scientist candidate must have been a genius to score so far above him. And those floppers—he could not comprehend such intelligence. It didn't matter that he didn't understand the notations or the things they made reference to. Now that it had been pointed out to him, the meaning of those tabulations was plain. He held his camera up and recorded them again.

Muller slapped the photo plates down on top of the papers. "As for these—" he said. "These are brain tissue." He indicated three sheets of eight photos each. "These came from the floppers—the smart ones. And these"—he tapped another set—"are a man's brain. I figured you'd want to compare them, but don't trust it too far—floppers' brain aren't made the same. This one's"—he pointed to the fifth set of photos—"from a normal flopper—one of the boys we keep around to do the work for us."

Hitchcock tried to study the photo plates—tried to discover the similarities and the differences in them. But his eye was not trained—he didn't know what to look for. The plates were as meaningless as the data sheets had been. Again, Sigurd Muller helped him.

"We use a variable intensity dye," he explained. "Where it's thin, it shows up red—where it's heavy, it's blue. We put it in one cell on each plate."

He tapped one of the photo plates—the human one—where a blue splotch lay against a pale green-yellow background. Rootlike arms spread out from the splotch in all directions, branching and rebranching into countless red filaments thinner than hairs.

"That's one brain cell," he said. "Those"—he indicated the arms and the red filaments—"are how it makes connections with the other cells. Put a lot of 'em together and you've got a whole network of connections. This one's different from the others, but all of 'em have connections like that. That's what makes for intelligence—connections."

Hitchcock frowned. These things were difficult to grasp. "Repeat that," he requested.

"Take it this way," Muller said. "Intelligence depends on a lot of units being tied up together in a network of communication—a lot of connections and a lot of channels of contact. The smarter you are, the more inter-connections you've got, and it goes the same the other way around. So there's two ways you can be smart, if you've got a big enough brain case to start with. You can have ordinary-size brain cells with a lot of these connecting threads, or you can have a lot of cells smaller than normal. Now—look what we've got here."

He tapped the plate with the human brain cells on it. "Here we've got normal size cells with a whole mess of connections." He moved his finger on to the samples from the normal flopper. "This boy was dumb—these pictures are the same scale. The cells are almost as big, and they don't have anywhere near as many contacts."

Hitchcock was using his camera where Muller pointed. He could see that everything was exactly as Muller described it. Muller shifted to the three sets taken from the intelligent floppers. "Now look at these," he was saying.

The cells were much smaller—not half the size of the cells from the normal flopper—and connecting filaments radiated out from them, proliferating endlessly. They looked like spiderwebs.

Hitchcock caught his breath. Why, minds built of cells like these would be incalculably powerful.

Muller smiled at him. "You catch on easy," he said.

"Why, they . . . how magnificent!" Hitchcock exclaimed.

This was the proof he wanted—proof that he was told a lie when he was told the floppers were mindless, dumb animals. Proof—undeniable proof—that the floppers were people, and that therefore they were entitled to the fundamental rights of all human beings.

But then an unsettling question—a moment of doubt—came into his thoughts. "How . . . how did you obtain these . . . these wonderful specimens?"

Muller snorted. "How do you think? You don't think we'd let 'em run around loose, do you?"

Hitchcock was aghast. "You killed them!"

"Sure," Muller said. "So what? They're only animals."

INTERLUDE

The deadfall had mashed the small animal practically flat, but some of its springy bones flexed back into shape when Kosh-korrozasch levered the ice block off it. He could see what it had looked like.

What he saw astonished him. It was unlike any creature he had ever seen.

Expertly, he tore off a hind leg. A strip of flank peeled off with it. He squatted in the shelter of a rock ledge and gobbled it, bones and all. Then he tore off the other hind leg.

His hunger subsided then. He paused to examine the carcass more slowly. He had thought he knew all the creatures in the world—their shape, their habits, what they could do, and how they tasted. But this was not one of them.

It made him wonder.

A cold wind-gust blasted him, ruffing his pelt. He hardly noticed. He pondered how it was possible an animal could exist anywhere in the world,

and he had not seen it till now. Never, till now, had he seen an animal he did not recognize—not since cubhood, when he was freshly come from his parent's pouch.

From his high vantage, here in a cleft where the land reached a narrow, white tendril up into the mountains, Kosh-korrozasch looked out at the world. The white, featureless land spread wide and far in the seven directions, and the mountains that surrounded the land were rough and massive—dark, and patched with white on their slopes. And there, out in the middle of the land where no mountain belonged, the great, lonely peak rose jaggedly to a flat crest. It was as if one of the monsters that lurked underground had been frozen at the moment it was smashing its way up to freedom.

Kosh-korrozasch had been everywhere in that world—had trod every part of the white, cold land—had searched all the tendrils of land that probed into the mountains—searched all the way to their ends, to where the mountains themselves blocked his way. And he had struggled nearly to the top of the great, lonely peak, there in the middle of the land; he had scraped the scale-food from the rocks up there, on the side where the wind rarely came.

He had learned where there was food in the world, and where there was none. He had learned how to find it, to trap it, to stalk it, and kill it. He knew all he needed to know about the world, and all the animals in it.

... Except this one dead thing his trap had killed. He wrenched the rearward half of the body from the rest of it, and ate it slowly. It was good tasting food. It filled him with a sense of well-being—of having eaten. Eating was too rare a pleasure. Kosh-korrozasch had been part-starved all his life.

But the creature's strangeness still nagged him. He crumbled the thing's foreleg in his maw, and pondered. It was only then that the thought came to him.

It was a strange thought—strange and frightening. But it excited him, and his paws trembled while he ate the rest of the carcass. He ate slowly, savoring the pleasure of food, feeling the thrill and the wonder of his new thought.

Perhaps there was something beyond the edge of the world. Perhaps the creature had come from there.

Life was hard, here in this world. A being starved all his life, and died of hunger. A person spent all his life seeking food, building traps, while the dull ache of hunger gnawed his belly, driving him endlessly on, never satisfied.

Kosh-korrozasch paused when he had finished eating. Using the turquoise blood-dribble of his eating for a bait, he rebuilt the ice-block dead-fall. He might never come back here—he knew that—but he might. And if he came back, he might be needing desperately the food it might kill while he was gone.

When it was built, he went away. Climbing upslope, he followed the tendril of land that reached up into the mountains toward the edge of the world. If an animal could enter the world from outside, perhaps he could leave it the same way.

A person searched for food all his life. Slowly, Kosh-korrozasch climbed toward the edge of the world, searching.

V.

In thirty-two hours, the supply ship would leave this planet for Lambda Serpentis. Adam Hitchcock felt fine.

He would be glad to leave. The dome was like a prison. Outside, the wind was bitter cold and the sea crashed endlessly on the island's rocky shore. The domesticated floppers were always underfoot, brainlessly stupid. His quarters had none of the comforts a civilized man was accustomed to, and the food they served him was abominably plain.

His endurance had been rudely tested. He was impatient to return to civilization.

But he was satisfied. His mission had been a complete success. He had found out the facts—he knew the truth, and as soon as he returned home everyone would know the truth. The suffering natives would be given—finally—the aid denied them for so long.

And the record of his Society for Humane Practices would remain a record of unblemished success. Truly, he had reason to be proud.

Before he left, though, he had one more task. It was not important—actually only a mere formality; to give the scientists a chance to correct the conditions he had exposed. They would refuse him, of course—he expected that—but when they refused, they would lose their right to protest when he aroused public censure against them.

He walked into the office of Ben Reese. Reese, engrossed in the mounds of paper on his desk, did not see him at once.

"I'm a fair man," Hitchcock proclaimed.

Ben Reese looked up, startled. His paperwork was like a fortress around him. "Did I ever say you weren't?" he wondered innocently.

Implacably, Hitchcock went on. "I have proof," he declared, "absolute proof—that the natives of this planet are being maltreated and enslaved, that their needs have been ignored, and that your people have been hounding them to death. Nevertheless, I give you fair warning: if you do not correct



these conditions, I shall be compelled to make a public report of my findings. If you force me to do that, I will not be responsible for anything that happens afterward."

Reese listened in silence. "We're concerned with scientific research here," he explained apologetically. "Not welfare. To . . . to follow your demands would mean the end of everything we've worked for . . . everything we've hoped for—"

Doubletalk, of course. Hitchcock had expected that. He wasn't fooled.

"Everything you've worked for!" he repeated scathingly. "The deliberate suppression of a people as deserving of human rights as you or I! In clear conscience, I cannot stand by and permit this to go on! I shall—"

Reese raised a placating hand. "That is not true," he protested. He actually seemed embarrassed. "You forget, Mr. Hitchcock—they are animals, not people. Their minds are primitive . . . undeveloped."

"That," Hitchcock accused, "is a lie! I have definite proof that they are even more intelligent than men. *Any* men. I say you are deliberately suppressing them because you fear what they could become!"

Gesturing helplessly, Reese said softly, "I have not seen this evidence."

"Another lie!" Hitchcock accused. He shook his fist. "Do you expect me to believe," he stormed, "that one of your men could have this evidence and you did not know of it? The whole idea is preposterous."

"But I *don't* know of it," Reese insisted. He sounded almost reasonable. "What proof? Where did you get it?"

"Your man in charge of intelligence testing showed me some of his records," Hitchcock stated. "And some photographs of brain tissue. They prove conclusively that the floppers . . . that the natives of this planet have minds as good as yours or mine."

Ben Reese was like a man stunned. "I know nothing about this," he protested blankly. "Are you . . . are you sure the evidence really proves that? I mean, perhaps you didn't understand—"

"If Dr. Muller had not helped me," Hitchcock replied, "the evidence would have meant nothing at all."

Reese shook his head. "This is hard to believe," he confessed. "Did . . . did he say why he was showing you these things?"

"He showed them to me," Hitchcock said, "because I asked him to. He was very co-operative, in spite of his contempt for them, which . . . he made absolutely no attempt to conceal. He said—almost in so many words—that you are doing everything you can to suppress them. He was *proud* of it!"

Reese looked worried. His idle hands, unnoticed, were nervously tearing notepad paper into progressively smaller and smaller bits. A pile of confetti-sized fragments collected on his blotter.

Hitchcock felt a wonderful exhilaration. He had the man totally helpless.

He was about to rise, repeat his ultimatum, and walk out, when Reese turned to the phone at his elbow, saying, "Excuse me a moment. Please."

Without waiting for a reply, he punched out a number. The phone's light blinked. A voice rasped from the speaker.

"Brains department, Muller speaking."

"Sigurd?" Reese asked. "This is Ben. Would you mind coming down here? Something has come up."

"Yeah? Like what?"

"I'd much rather you came down," Reese said mildly. "It's rather complicated."

Muller made an annoyed sound, but then he said, "I'll come." The phone's light went out.

Reese turned back to Hitchcock. "We'll wait till he gets here," he proposed. "All right?"

Reluctantly, Hitchcock sat back and folded his arms. Scowling, he waited. This was something he hadn't expected.

Not that it made any difference, of course. Reese was caught in an impossible position. All he could possibly do was try to justify himself.

Hitchcock settled back to wait. He was supremely confident. Just let him try to justify himself. Just let him try!

He could not do it.

VI.

Ben Reese was deeply troubled. Adam Hitchcock was a well-intentioned fool, and his ability to understand was limited, but Sigurd must have shown him something. Whatever else had happened—whatever else he had been told—Hitchcock must have seen something.

Ben Reese tried to imagine what it could have been. He couldn't. He would have to wait. Sigurd Muller would have to explain.

Reese pretended to be busy with his papers. It was all the excuse he could think of to not talk to Hitchcock while they waited. But he couldn't work. There was a lot that still had to be gone over before the *Wayfarer* went back to Lambda Serpentis, but until Muller came and the matter was settled, he could not put his mind to it.

Then Muller walked in, his pointed beard jutting like a prow. He glanced around quickly, noticed Hitchcock, but didn't even pause. "What's up?" he asked jauntily. He grabbed a chair, whirled it around, and straddled it.

Reese put his papers aside. "Mr. Hitchcock tells me the floppers are intelligent," he explained. "That you showed him proof of it."

Muller's eyes shifted from Reese to Hitchcock, then back again. "He did, huh?" he said neutrally.

"This was the first I'd heard of it," Reese said pointedly.

Muller shrugged. "So what?" he said. "If you'd look at the reports I turn in—" He gestured at the papers on the desk.

"I have read your reports," Reese said. "I studied them carefully. You did not mention this development."

"Yeah?" Muller challenged. "Who're you saying that for? Me or him?" He jerked a thumb at Hitchcock.

Reese didn't let himself be steered off. "Do you confirm it?" he persisted.

Muller glanced at Hitchcock again before he answered. "Yeah," he admitted. "There's been a few smart ones turn up."

So it was true! Reese wanted to shout with excitement. "How many?" he asked breathlessly.

"Three," Muller said, holding up fingers. "Three of 'em so smart they scare you. And all from the same country. There's a lot more up there, too—running loose."

"You're sure of that?" Reese asked. It was more than he dared to believe.

"Yeah," Muller said grimly. "There's been a population jump, up there, and everything else has stayed the same. How would you figure it?"

Reese nodded slowly. He sighed. Put together like that, the evidence was good enough—the conclusion was valid. He turned to Hitchcock. "Is this what he told you?"

"Substantially," Hitchcock affirmed.

Reese turned back to Muller. A suspicion had grown in him, ugly and fearful. Now he had to destroy it—or see it confirmed.

"He tells me you showed him test records," he said cautiously. "And photos of brain tissue. Were they authentic?"

"Sure they're authentic," Muller retorted. "You think I'd fake a thing like that? Look—all I did was show him around, and show him how we work, and I answered his questions and let him see everything he wanted to see. You got any objections to that?"

Reese shook his head. "To that? No," he conceded. "But these brain tissue samples—I presume you took them from the different sections of their brains."

"I know how to take specimens," Muller answered defiantly.

Reese felt sick and old. "You killed them," he decided. "All three."

"Right," Muller snapped. He smiled with clenched teeth, fiercely proud of himself.

"Sigurd," Reese said reproachfully, "you've done a terrible thing." He turned to Hitchcock again.

"I wish this hadn't come out while you were here," he confessed. "I can only say that I heard nothing about these intelligent ones until now, and that Sigurd killed them without my knowledge. If I had known, I would have stopped him. He acted against regulations and against our policies. I am grateful to you for exposing him."

Muller shot to his feet, his hands fisted. "Exposing me!" he snarled. "Why you little—"

With an effort, Reese kept his voice even. "You may go now, Sigurd," he said. "I . . . I suggest that you start packing. You have"—he glanced at the clock—"thirty hours before the ship leaves. If anyone asks, tell them that you resigned, and that I accepted your resignation."

Muller's face turned savage with rage. He hurled the chair out of his way and walked up to the desk until it bumped his knees. "You don't make a goat of me that easy," he threatened through his teeth. He jerked a thumb at Hitchcock. "What about him? You can't shut *him* up. What are you going to do? Pat him on the head and tell him be good?"

Reese glanced at Hitchcock. There was a firmness of decision on the man's hollow-jowled face—a look of holy purpose about his eyes. As he watched, the man rose to his feet with solemn dignity, a bone-lean figure clad in black.

"You're a very clever man, Mr. Reese," he conceded with gleeful ferocity. "But not clever enough. You cannot deny the things I have seen with my own eyes. Nor can you lay all the blame at the feet of your underlings. What this man has done"—he gestured at Muller—"has no bearing on the fundamental fact that the welfare of this planet's natives has been willfully

and shamefully ignored—and that you have refused to do anything about it. If you do not correct this situation at once, I will expose you to every civilized community in the universe!”

“But you don’t understand,” Reese protested.

“I have not yet finished,” Hitchcock snapped. “In addition, if you still refuse, we—my Society for Humane Practices and I—shall do it ourselves. We shall sponsor a public subscription. We shall send food, clothes—all the things these poor people need. As many shiploads as necessary. And we shall see that you and all your scientists are removed from this planet. Your presence here will not be tolerated.”

“Have you any idea how much it would cost?” Reese wondered.

“The cost is not important,” Hitchcock said. “The public will gladly pay whatever is needed.”

Reese conceded the point. The knowledge that he could not win against this man was strong in him. It paralyzed his will. He wished he were a woman, or a child, so he could retreat into the weakness of frustrated tears.

“You’ve done this sort of thing before, haven’t you?” he said bitterly, remembering what he had heard of Hitchcock’s doings on other planets.

“I have,” Hitchcock confirmed. “I have been very successful at it.” He paused, waiting for Reese to speak. Reese said nothing.

“If you have nothing more to say—” he said. He turned toward the door.

Desperately, then, Reese spoke.

“Only this,” he said with a firmness he did not feel. Hitchcock turned back and faced him. He tapped a finger on the desk. “I gather from what Sigurd has said that some floppers may be intelligent,” he said. He spoke very slowly, deliberately. “Some, but not all. In fact, speaking in terms of the entire planetary population, only a very few are intelligent. All the rest are still animals.”

Hitchcock was not impressed. “All of them need our help,” he stated. “We cannot and we shall not give it to some and deny it to others, no matter what criterion you propose. I can think of nothing so unthinkable.”

“The point I’m trying to make,” Reese persisted patiently, “is that . . . that the floppers are in a period of transition. Right now, only some of them are intelligent—only a few. But some day, all of them will be intelligent, because . . . because they are living under arduous conditions, and the intelligent ones are better able to survive—the population increase Sigurd mentioned is evidence of that. So, comparatively speaking, a greater proportion of the intelligent ones will survive to maturity. And the mature ones will tend to live longer than . . . than the ordinary ones—so they will tend to produce more young. It’s a perfect example of the natural selection process. But it *won’t* happen if we try to help them.”

“What?” Hitchcock demanded. “Preposterous!”

“It . . . it’s very true,” Reese assured him. “You see, if we gave them everything they need, the intelligent ones wouldn’t have an advantage over the ordinary ones—they’d all have an equal life-expectancy. And the ordinary ones outnumber the intelligent ones by a fantastic margin, so—even if the intelligence gene-complex is a dominant—the intelligent ones would be absorbed into the race within a few generations. There wouldn’t be anything left of them.”

Hitchcock appeared to consider the argument, but his face was set stubbornly. Bitterly, Reese wondered if the man understood a thing he'd said.

Then Hitchcock spoke. "Am I to conclude, then," he said, "that you *want* the natives to suffer? To starve? To . . . to *die*? To battle each other for a scrap of food? Do you admit that this is what you want?"

He had understood part of it, Reese concluded glumly. The ugly part. "I think it is necessary," he had to admit. "I think it is the only way the floppers can advance. Remember, something like this must have happened to our own ancestors. If it hadn't, we would still be mindless brutes."

"Nonsense," Hitchcock snapped. "The fact that our ancestors had no one to help them has nothing to do with it. They would have become men no matter what happened. It was their *destiny* to become men—the same destiny as these poor people, here. Nothing can possibly stand in their way—no man can interfere with destiny. They are suffering and dying because you deliberately neglect their welfare. You have the power to end that suffering, and you are morally bound to do it. To refuse, Mr. Reese, is to turn your back on humanity."

Reese sat perfectly still, a feeling of blind hopelessness crushing down on him. "I think," he said slowly. "I think I know why Sigurd helped you so much. He wants to suppress the intelligent ones. Am I right, Sigurd?"

"Sure I want 'em kept down," Muller snapped. "We'd better, if we know what's good for us. You've seen the wild ones—they're a bunch of animals. Nothing they'd like better than to tear a man apart and eat the pieces."

"On the other hand," Reese put in thoughtfully, "the ones here in the outpost are docile."

Muller disparaged the point with a wave of the hand. "They don't count," he claimed. "They're way off the main track. It's the ones on the mainland that count. If we let *them* get smart, there'll be no stopping 'em. They'll hunt us down. *We'll* be the animals! If we don't stop 'em, they'll chase us right out of the universe. Right now, we can stop 'em. Later on it'll be too late. So we'd better get at it. Right now."

He really believed it, Reese realized wonderingly. He meant every word of it.

"Sigurd, I don't agree," Reese said slowly. He hoped he sounded reasonable. "In the first place, we conducted some personality experiments on them about twenty years ago. We took the offspring of wild floppers and raised them with our tame ones. They developed none of the . . . the bloodthirsty traits of their parents. So I'm sure that this . . . this viciousness we see in them is a characteristic forced on them by their environment."

"Yeah?" Muller scoffed. "But the smart ones aren't growing up here in the dome. They're growing up out there—on the mainland."

Reese nodded. "True," he admitted. "But before they could be any danger to us, they would have to develop a civilization—a technology. And one of the characteristics of a technological civilization is the ability of its people to control their environment. By removing the causes of their viciousness, they would also remove the need for being vicious. Also, I believe they have shown this same viciousness toward each other—to the point of cannibalism. But recently, I understand, some of them have taken to hunting in groups. They have discovered the advantages of co-operation.

Don't you think this shows a trend away from . . . from animal savageness? Don't you, Sigurd?"

"You want to take a chance on it?" Muller challenged.

"Taking that chance is the only honorable thing we can do," Reese told him firmly.

"Huh!" Muller snorted. "And how do you think they'll look at us, once they get smart, with us sitting here not doing a thing to help 'em? They'll hate us. They'll hate us like hell!"

Reese hesitated, then shook his head. "No, Sigurd," he decided. "The transition will be a slow, very gradual process. It will be all right to start helping them long before they could become a danger to us. Also, if they do become as intelligent as you say, they will probably understand that they could not have evolved to intelligence if we had tried to help them."

Muller snorted disgustedly. "You're doing a lot of supposing," he said. "Suppose you're wrong? It's the whole future of the human race you're talking about, you know. That's . . . that's *us*!"

Reese nodded. "I know," he admitted placidly. "Whatever we do—whatever we decide—it will be thousands of years before the consequences come. I rather imagine we'll have been forgotten. That puts a terrible responsibility on us. We must try to do what is right."

"And on that basis you refuse to help them?" Hitchcock demanded. "Mr. Reese, I have never heard such a preposterous—!"

So all his arguments and efforts at persuasion had failed. Reese slumped in his chair, his arms on the rests. He wondered what to do. Muller's careful half-truths—Hitchcock's stubborn ignorance—together they were too much to fight. He could do nothing. He was helpless. Defeat and frustration wearied him, and he felt a sick pity for all the intelligent floppers who would now never be born.

It wasn't fair. It just wasn't fair.

But he did not say it. Thinking it to himself, he realized how futile it was to speak of fairness to these men. And besides, by what right could he ask for fairness—an ideal—from the real world?

Of course it wasn't fair. Nothing was ever completely fair in the real world, because the real world conformed to the physical laws, not the rules of sportsmanship and fair play.

It was a hard, bitter thought to accept, but Ben Reese accepted it. As a scientist, he had to accept it no matter how he felt about it.

And in that recognition, he saw, was the key—the way he could protect the floppers from both these men.

He turned to his phone again. "You will excuse me, won't you?" he requested politely as he punched the number combination. His hand trembled.

Before either Hitchcock or Muller could nod their assent, someone answered the phone. "Clinic," he said.

"Nick?" Reese guessed. "This is Ben. Could you send up a couple of your boys?"

"Sure," the one identified as Nick consented. "But what—?"

"Never mind," Reese said quickly. "Just send them." He broke the connection.

"What's the matter?" Muller wanted to know. "You feel sick?"

Reese ignored the question. "I've changed my mind, Sigurd," he said. "You can stay here."

Muller backed up a step. "Well, now, I don't know," he said warily. He scratched his beard. "I've been here a long time—"

"But Sigurd," Reese urged. "We're going to need you here—at least for the next year. All the information you've held back—"

"It's in my files," Muller said. "You'll find it, if you want it bad enough." He moved toward the door. "I'm going to pack." In a moment, he was gone.

Reese smiled a complacent smile. "There'll be no room for him in the ship," he confided to no one in particular. He leaned forward. "As for you, Mr. Hitchcock . . . sit down, please. There's one thing more I want to say."

Hitchcock paused uncertainly, then resumed his chair. "Let it never be said," he declared, "that I will not hear all arguments."

Reese nodded, pleased. Everything would be all right if he could keep Hitchcock in his office until the boys came from the clinic.

"Mr. Hitchcock," he said, "in a sense, I'm very glad you came."

Hitchcock scowled.

"For one thing," Reese went on, "it was you who . . . who brought out the fact that the floppers are developing intelligence. If you hadn't come, Sigurd might have concealed it for years. Of course, Sigurd was hoping you'd help him to . . . to wipe out the intelligent ones, but that is beside the point."

"Mr. Reese," Hitchcock said sternly. "You cannot convince me that black is white."

"Oh, of course," Reese agreed willingly. "But there are hundreds of shades of gray. The other reason I'm glad you came . . ." He spoke earnestly. "You've forced me to re-examine what we're doing here—to . . . to question the rightness of our doing nothing about the conditions in which the floppers live. It's not an easy thing to be sure of."

"So you admit it!" Hitchcock pounced triumphantly. "You admit—"

Reese silenced him with a gesture. "No," he said firmly, "I do *not* admit it. I have come to the same conclusions I have always held. But now—because of you—I know *why* it is right."

"Impossible," Hitchcock objected. "It is *not* right."

Ben Reese was very patient with him. He could afford to be patient—it used up time, while the boys from the clinic were coming.

"You're a very moral man, Mr. Hitchcock," he said. "I'd be the first to admit it. But—unfortunately—a high moral sense isn't enough. You see, Nature *isn't* moral—it doesn't conform to our concepts of right and wrong, and it isn't limited to conditions where the right and wrong of a matter are easy to decide. There are times when an act that seems morally right can lead to . . . to something horrible. You cannot say a thing is morally right or wrong until you've considered the context in which it happens. And that, Mr. Hitchcock, is where your moral sense fails you."

"I do not need a scientist to tell me the difference between right and wrong," Hitchcock stated stubbornly.

Reese nodded pleasantly. "I expected you'd say that," he admitted. "But you're wrong. Until you know the consequences of an act, you cannot tell whether or not it is moral. And there are times—such as now—when

a layman such as yourself does not understand the forces involved. When that happens, you cannot predict the consequences of an act. Therefore, you cannot decide whether it is right or wrong."

"You're wrong!" Hitchcock insisted. "The end *never* justifies the means! *Never!*"

Reese didn't deny it. He said, reasonably, "On the other hand, there are times when no other test applies—when all the possible courses of action look equally bad. And even when you can do something which seems absolutely right, you still have to think of the consequences. If the consequences are bad, the act itself must be bad. Or suppose there is a . . . a morally imperative goal which you can achieve only by doing things which any moral code would condemn."

Hitchcock was incredulous. "Such a thing could not happen," he objected.

"I am talking," Reese said firmly, "about now. About the situation here. That is the problem we have been dealing with here, ever since this outpost was built—whether to help them—give them comfort and security—and destroy for all time their hope of ever becoming more than animals—or whether we should let nature take its course—allow many to die, and many more to suffer, so that some day their descendants can stand before us as equals."

He shrugged expressively. "We can do only one thing. We must balance the wrong which we know we are doing against the goal we are morally obliged to support. We must go ahead and . . . and try not to let our consciences upset us too much."

"If you must rationalize a thing," Hitchcock stated, "it's wrong. Good does not come from evil!"

Reese shrugged helplessly. "We must do what we think is right," he said practically. "And if our judgments are different from someone else, we must follow our own. We—"

He broke off as the door opened. Two floppers came in, wheeling a stretcher. Each one had a big red cross dyed in the fur on its chest.

Reese pointed at Hitchcock. "That man is sick."

The floppers advanced, their resilient feet rustling softly on the floor. Hitchcock, taken aback by Reese's abrupt statement, thumbed his chest. "Me?" he wondered incredulously.

The floppers came up, one on each side of him. They grabbed his arms close to the shoulder. Hitchcock yipped with surprise, turned his head, and found the solicitous, repulsive face of a flopper only inches from his own.

With a strangled, terrified cry, he lunged from the chair. The floppers kept him from falling headlong on the floor. Wild-eyed, he struggled to get loose from them, but they held on. He kicked at them desperately. They dragged him backwards. His feet flailed the air.

"Make them let me go!" he begged. "Make these filthy monsters let me go!"

Reese sat back and relaxed. He was sorry he had to do this to the man, but it did somehow give him a pleasant feeling.

It wasn't, after all, as if Hitchcock was a really good man.

"I'm afraid I can't do that," he apologized. "They've been taught to take a sick man to the clinic. I couldn't stop them now if I wanted to." He spread his hands helplessly. "As I've said before, they're rather stupid."

One of the floppers moved behind Hitchcock and held both his arms.



The other flopper took an ampule from the pouch on its harness. Hitchcock stared at the shiny needle with the fascination of sheer terror. "Don't let him!" he screamed. "Don't let him! It's murder!"

The flopper peeled Hitchcock's sleeve up and stabbed the needle into the fleshy part of his arm. Hitchcock uttered a faltering cry, shuddered, and sagged.

"Oh, it's only a mild sedative," Reese assured him cheerfully. "We wouldn't dare trust them with anything stronger. But you shouldn't have struggled so much."

Hitchcock hung laxly in the flopper's arms. His eyes had a glassy look. The flopplers wrapped a blanket tightly around him. His mouth moved as if he was trying to speak, but no words came out.

"The ship is going to leave without you," Ben Reese said. "I'm sorry about that, because I don't think I'm going to enjoy your company for the next year. We'll tell them . . . I think we'll tell them you're sick. A . . . a local disease—one we don't want to spread on other planets. There aren't any diseases like that, of course, but that doesn't matter."

He was very apologetic about the whole thing.

Hitchcock was making apoplectic noises now. "Outrage! Criminal! I'll have the law on you!" For a man of firm moral fiber, some of his comments were remarkably unprintable.

Ben Reese shrugged. "I'm afraid there isn't any law here," he apologized. "We didn't need any, till you came along. I . . . I'm sorry we have to do this to you, but—well, we can't let you go back to Earth. You'd agitate to have our charter revoked and . . . and then you'd organize this gigantic interstellar aid program, and destroy the floppers' only hope of ever being anything more than animals. We . . . we just can't let you do that."

By this time, Hitchcock was wrapped in the blanket like a mummy. Gently, the floppers lifted him and laid him in the cradlelike stretcher. "You won't get away with this!" he threatened wrathfully.

The floppers fumbled deftly with the straps, securing him. Their digitless hands were remarkably dexterous. All Hitchcock could move was his head and his mouth.

"Oh, we'll have to let you go next year, of course," Reese admitted. He wasn't disturbed by the thought. "But that is a whole year away. We'll have plenty of time to prepare the public for you. If we give them the whole truth now, I rather doubt they'll be much impressed with your partial truths later on. I'll send instructions about that to our business office on Lambda. Just to announce that the floppers are beginning to evolve should be a good start, and—"

He smiled. He felt wonderful. Perhaps treating Hitchcock this way was lousy and unethical, but even Hitchcock himself would have to admit that—when everything was considered—it was definitely a moral act.

The floppers began to wheel Hitchcock out of the room. Hitchcock was raving.

"You can't do this to me!" he protested. "You can't!"

"Really?" Ben Reese wondered innocently. He knew it was cruel, but the temptation was too strong.

"Really, Mr. Hitchcock," he said, "*I must have proof.*"

EPILOGUE

Slowly, the procession marched past the bier of the Dead One, who was nameless because he was dead, and who had been their leader. Each one, as he came to the bier, crouched low in obeisance, then moved on. The shaman stood over the bier, his pelt stained green to signify that he personified the Dead One. He acknowledged each obeisance by raising his arms.

Shokk-elorrisch stood beside the bier, and he also acknowledged the obeisances, for he was the new leader in the Dead One's stead. Already, he held the tool-stone in his hand, and he chanted the four harsh syllables: "My eyes shall find the path for your feet; my hand shall feed you and my pelt shall warm you; I am all of you; I give you my self."

This he spoke to each one who made obeisance to him, and each one responded: "Show me the path!"

The procession shuffled on, and formed ranks beyond the bier. And

when the last one had made his obeisance, the three eldest-born from the Dead One's body came forward. They lifted the vine-woven sling which cradled the Dead One. Flanked by Shokk-elorrish on one side and the shaman on the other—all of them chanting: "You are all of us; your eyes saw the path; your hand fed us; your pelt warmed our bodies. We are grateful; we honor you; we sanctify the memory of you; we give you back to yourself!"

Chanting this, their tread matched to the chant, they advanced to the edge of the cliff. There they stopped, and the cadenced rhythm of their chant broke with the cry, "We cast you out!" and they hurled the Dead One into the foaming sea.

And the sons of the Dead One and the shaman turned to Shokk-elorrish. They made obeisance to him, and they said: "Show us the path!"

But Shokk-elorrish did not answer, nor did he show them any sign that he heard. Standing at the cliff edge, the wind rippling his pelt and the waves crashing on rocks far below, he faced out to sea and made obeisance to the Olympians who lived on the round mountain, there on the island that rose from the horizon—the Olympians, who never had to migrate in search of new hunting ground, and who watched from the boulder that floated like a cloud in the wind—who watched but took no part in the things they witnessed.

And he wondered, even as he made obeisance to them, why they kept themselves aloof, and what was the source of their powers, and whether his people, too, could achieve those powers—to become the equals of those strange and enigmatic beings.

And he wondered, too, would they teach him? Would they teach him if he went to that mountain—out there in the ocean? Would they permit him to learn the secret of their powers?

He wondered how to cross those tattered waves—how to climb that shore and ascend to the crest of that mountain.

Thinking thus, Shokk-elorrish knew what his path would be. And the path of his people.

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DUST RAG

By HAL CLEMENT

Illustrated by van Dongen

It has been said before that the little things in life are what count. The big things about living on another world are easy to predict; it's the petty nuisances . . . that are deadly!

"CHECKING out."
"Checked, Ridge. See you soon."

Ridging glanced over his shoulder at Beacon Peak, as the point where the relay station had been mounted was known. The gleaming dome of its leaden meteor shield was visible as a spark; most of the lower peaks of Harpalus were already below the horizon, and with them the last territory with which Ridging or Shandara could claim familiarity. The humming turbine tractor that carried them was the only sign of humanity except each others' faces—the thin crescent of their home world was too close to the sun to be seen easily, and Earth doesn't look very "human" from outside in any case.



The prospect ahead was not exactly strange, of course. Shandara had remarked several times in the last four weeks that a man who had seen any of the moon had seen all of it. A good many others had agreed with him. Even Ridging, whose temperament kept him normally expecting something new to happen, was beginning to get a trifle bored with the place. It wasn't even dangerous; he knew perfectly well what exposure to vacuum would mean, but checking spacesuit and air-lock valves had become a matter of habit long before.

Cosmic rays went through plastic suits and living bodies like glass, for the most part ineffective because unabsorbed; meteors blew microscopic holes through thin metal, but scarcely marked spacesuits or hulls, as far as current experiences went; the "dust-hidden crevasses" which they had

expected to catch unwary men or vehicles simply didn't exist—the dust was too dry to cover any sort of hole, except by filling it completely. The closest approach to a casualty suffered so far had occurred when a man had missed his footing on the ladder outside the *Albireo's* air lock and narrowly avoided a hundred and fifty foot fall.

Still, Shandara was being cautious. His eyes swept the ground ahead of their tracks, and his gauntleted hands rested lightly on brake and steering controls as the tractor glided ahead.

Harpalus and the relay station were out of sight now. Another glance behind assured Ridging of that. For the first time in weeks he was out of touch with the rest of the group, and for the first time he wondered whether it was such a good idea. Orders had been strict; the radius of exploration settled on long before was not to be exceeded. Ridging had been completely in favor of this; but it was his own instruments which had triggered the change of schedule.

One question about the moon to which no one could more than guess an answer in advance was that of its magnetic field. Once the group was on the surface it had immediately become evident that there was one, and comparative readings had indicated that the south magnetic pole—or a south magnetic pole—lay a few hundred miles away. It had been decided to modify the program to check the region, since the last forlorn chance of finding any trace of a gaseous envelope around the moon seemed to lie in auroral investigation. Ridging found himself, to his intense astonishment, wondering why he had volunteered for the trip and then wondering how such thoughts could cross his mind. He had never considered himself a coward, and certainly had no one but himself to blame for being in the tractor. No one had made him volunteer, and any technician could have set up and operated the equipment.

"Come out of it, Ridge. Anyone would think you were worried." Shandara's careless tones cut into his thoughts. "How about running this buggy for a while? I've had her for a hundred kilos."

"Right." Ridging slipped into the driver's seat as his companion left it without slowing the tractor. He did not need to find their location on the photographic map clipped beside the panel; he had been keeping a running check almost unconsciously between the features it showed and the landmarks appearing over the horizon. A course had been marked on it, and navigation was not expected to be a problem even without a magnetic compass.

The course was far from straight, though it led over what passed for fairly smooth territory on the moon. Even back on Sinus Roris the tractor had had to weave its way around numerous obstacles; now well onto the Mare Frigoris the situation was no better, and according to the map it was nearly time to turn south through the mountains, which would be infinitely worse. According to the photos taken during the original landing approach the journey would be possible, however, and would lead through the range at its narrowest part out onto Mare Imbrium. From that point to the vicinity of Plato, where the region to be investigated lay, there should be no trouble at all.

Oddly enough, there wasn't. Ridging was moderately surprised; Shandara seemed to take it as a matter of course. The cartographer had eaten, slept, and taken his turn at driving with only an occasional remark. Ridging was beginning to believe by the time they reached their goal that his companion was actually as bored with the moon as he claimed to be. The thought, however, was fleeting; there was work to be done.

About six hundred pounds of assorted instruments were attached to the trailer which had been improvised from discarded fuel tanks. The tractor itself could not carry them; its entire cargo space was occupied by another improvisation—an auxiliary fuel tank which had been needed to make the present journey possible. The instruments had to be removed, set up in various spots, and permitted to make their records for the next thirty hours. This would have been a minor task, and possibly even justified a little boredom, had it not been for the fact that some of the "spots" were supposed to be as high as possible. Both men had climbed Lunar mountains in the last four weeks, and neither was worried about the task; but there was some question as to which mountain would best suit their needs.

They had stopped on fairly level ground south and somewhat west of Plato—"sunset" west, that is, not astronomical. There were a number of fairly prominent elevations in sight. None seemed more than a thousand meters or so in height, however, and the men knew that Plato in one direction and the Teneriffe Mountains in the other had peaks fully twice as high. The problem was which to choose.

"We can't take the tractor either way," pointed out Shandara. "We're cutting things pretty fine on the fuel question as it is. We are going to have to pack the instruments ourselves, and it's fifty or sixty kilometers to Teneriffe before we even start climbing. Plato's a lot closer."

"The *near side* of Plato's a lot closer," admitted Ridging, "but the measured peaks in its rim must be on the east and west sides, where they can cast

shadows across the crater floor. We might have to go as far for a really good peak as we would if we headed south."

"That's not quite right. Look at the map. The near rim of the crater is fairly straight, and doesn't run straight east and west; it must cast shadows that they could measure from Earth. Why can't it contain some of those two thousand meter humps mentioned in the atlas?"

"No reason why it *can't*; but we don't know that it *does*. This map doesn't show."

"It doesn't show for Teneriffe, either."

"That's true, but there isn't much choice there, and we know that there's at least one high peak in a fairly small area. Plato is well over three hundred kilometers around."

"It's still a closer walk, and I don't see why, if there are high peaks at any part of the rim, they shouldn't be fairly common all round the circumference."

"I don't see *why* either," retorted Ridging, "but I've seen several craters for which that wasn't true. So have you." Shandara had no immediate answer to this, but he had no intention of exposing himself to an unnecessarily long walk if he could help it. The instruments to be carried were admittedly light, at least on the moon; but there would be no chance of opening spacesuits until the men got back to the tractor, and spacesuits got quite uncomfortable after a while.

It was the magnetometer that won Shandara's point for him. This pleased him greatly at the time, though he was heard to express a different opinion later. The meter itself did not attract attention until the men were about ready to start, and he had resigned himself to the long walk after a good deal more argument; but a final check of the recorders already operating made Ridging stop and think.

"Say, Shan, have you noticed any sunspots lately?"

"Haven't looked at the sun, and don't plan to."

"I know. I mean, have any of the astronomers mentioned anything of the sort?"

"I didn't hear them, and we'll never be able to ask until we get back. Why?"

"I'd say there was a magnetic storm of some sort going on. The intensity, dip, and azimuth readings have all changed quite a bit in the last hour."

"I thought dip was near vertical anyway."

"It is, but that doesn't keep it from changing. You know, Shan, maybe it would be better if we went to Plato, instead."

"That's what I've been saying all along. What's changed your mind?"

"This magnetic business. On Earth, such storms are caused by charged particles from the sun, deflected by the planet's magnetic field and forming what amounts to tremendous electric currents which naturally produce fields of their own. If that's what is happening here, it would be nice to get even closer to the local magnetic vertical, if we can; and that seems to be in, or at least near, Plato."

"That suits me. I've been arguing that way all along. I'm with you."

"There's one other thing—"

"What?"

"This magnetometer ought to go along with us, as well as the stuff we were taking anyway. Do you mind helping with the extra weight?" Shandara had not considered this aspect of the matter, but since his arguments had been founded on the question of time rather than effort he agreed readily to the additional labor.

"All right. Just a few minutes while I dismount and repack this gadget, and we'll be on our way." Ridging set to work, and was ready in the specified time, since the apparatus had been designed to be handled by spacesuited men. The carrying racks that took the place of regular packs made the travelers look top-heavy, but they had long since learned to keep their balance under such loads. They turned until the nearly motionless sun was behind them and to their right, and set out for the hills ahead.

These elevations were not the peaks they expected to use; the moon's near horizon made those still invisible. They did, however, represent the outer reaches of the area which had been disturbed by whatever monstrous explosion had blown the ring of Plato in the moon's crust. As far as the men were concerned, these hills simply meant that very little of their journey would be across level ground, which pleased them just as well. Level ground was sometimes an inch or two deep in dust; and while dust could not hide deep cracks it could and sometimes did fill broader hollows and cover irregularities where one could trip. For a top-heavy man, this could be a serious nuisance. Relatively little dust had been encountered by any of the expedition up to this point, since most of their work had involved slopes or peaks; but a few annoying lessons had been learned.

Shandara and Ridging stuck to the relatively dust-free slopes, therefore. The going was easy enough for experienced men, and they traveled at pretty fair speed—some ten or twelve miles an hour, they judged. The tractor soon disappeared, and compasses were useless, but both men had a good eye for country, and were used enough to the Lunar landscape to have no particular difficulty in finding distinctive features. They said little, except to call each other's attention to particularly good landmarks.

The general ground level was going up after the first hour and a half, though there was still plenty of downhill travel. A relatively near line of peaks ahead was presumably the crater rim; there was little difficulty in deciding on the most suitable one and heading for it. Naturally the footing became worse and the slopes steeper as they approached, but nothing was dangerous even yet. Such crevasses as existed were easy both to see and to jump, and there are few loose rocks on the moon.

It was only about three and a half hours after leaving the tractor, therefore, that the two men reached the peak they had selected, and looked out over the great malled plain of Plato. They couldn't see all of it, of course; Plato is a hundred kilometers across, and even from a height of two thousand meters the farther side of the floor lies below the horizon. The opposite rim could be seen, of course, but there was no easy way to tell whether any of the peaks visible there were as high as the one from which the men saw them. It didn't really matter; this one was high enough for their purposes.

The instruments were unloaded and set up in half an hour. Ridging did most of the work, with a professional single-mindedness which Shandara made no attempt to emulate. The geophysicist scarcely glanced at the crater

floor after his first look around upon their arrival, while Shandara did little else. Ridging was not surprised; he had been reasonably sure that his friend had had ulterior reasons for wanting to come this way.

"All right," he said, as he straightened up after closing the last switch, "when do we go down, and how long do we take?"

"Go down where?" asked Shandara innocently.

"Down to the crater floor, I suppose. I'm sure you don't see enough to satisfy you from here. It's just an ordinary crater, of course, but it's three times the diameter of Harpalus even if the walls are less than half as high, and you'll surely want to see every square meter of the floor."

"I'll want to see *some* of the floor, anyway." Shandara's tone carried feeling even through the suit radios. "It's nice of you to realize that we have to go down. I wish you realized why."

"You mean . . . you mean you really expect to climb down there?" Ridging, in spite of his knowledge of the other's interests, was startled. "I didn't really mean—"

"I didn't think you did. You haven't looked over the edge once."

Ridging repaired the omission, letting his gaze sweep carefully over the grayish plain at the foot of the slope. He knew that the floor of Plato was one of the darker areas on the moon, but had never supposed that this fact constituted a major problem.

"I don't get it," he said at last. "I don't see anything. The floor is smoother than that of Harpalus, I'd say, but I'm not really sure even of that, from this distance. It's a couple of kilos down and I don't know how far over."

"You brought the map." It was not a question.

"Of course."

"Look at it. It's a good one." Ridging obeyed, bewildered. The map was good, as Shandara had said; its scale was sufficient to show Plato some fifteen centimeters across, with plenty of detail. It was basically an enlargement of a map published on Earth, from telescopic observations; but a good deal of detail had been added from photographs taken during the approach and landing of the expedition. Shandara knew that; it was largely his own work.

As a result, Ridging was not long in seeing what his companion meant. The map showed five fairly large craterlets *within* Plato, and nearly a hundred smaller features.

Ridging could see none of them from where he stood.

He looked thoughtfully down the slope, then at the other man.

"I begin to see what you mean. Did you expect something like this? Is that why you wanted to come here? Why didn't you tell me?"

"I didn't expect it, though I had a vague hope. A good many times in the past, observers have reported that the features on the floor of this crater were obscured. Dr. Pickering, at the beginning of the century, thought of it as an active volcanic area; others have blamed the business on clouds—and others, of course, have assumed the observers themselves were at fault, though that is pretty hard to justify. I didn't really expect to get a chance to check up on the phenomenon, but I'm sure you don't expect me to stay up here now."

"I suppose not." Ridging spoke in a tone of mock resignation. The problem did not seem to concern his field directly, but he judged rightly

that the present situation affected Shandara the way an offer of a genuine fragment of Terrestrial core material would influence Ridging himself. "What do you plan to take down? I suppose you want to get measures of some sort."

"Well, there isn't too much here that will apply, I'm afraid. I have my own camera and some filters, which may do some good. I can't see that the magnetic stuff will be any use down there. We don't have any pressure measuring or gas collecting gadgetry; I suppose if we'd brought a spare water container from the tractor we could dump it, but we didn't and I'd bet that nothing would be found in it but water vapor if we did. We'll just have to go down and see what our eyes will tell us, and record anything that seems recordable on film. Are you ready?"

"Ready as I ever will be." Ridging knew the remark was neither original nor brilliant, but nothing else seemed to fit.

The inner wall of the crater was a good deal steeper than the one they had climbed, but still did not present a serious obstacle. The principal trouble was that much of the way led through clefts where the sun did not shine, and the only light was reflected from distant slopes. There wasn't much of it, and the men had to be careful of their footings—there was an occasional loose fragment here, and a thousand-meter fall is no joke even on the moon. The way did not lead directly toward the crater floor; the serrated rim offered better ways between its peaks, hairpinning back and forth so that sometimes the central plain was not visible at all. No floor details appeared as they descended, but whatever covered them was still below; the stars, whenever the mountains cut off enough sidelight, were clear as ever. Time and again Shandara stopped to look over the great plain, which seemed limitless now that the peaks on the farther side had dropped below the horizon, but nothing in the way of information rewarded the effort.

It was the last few hundred meters of descent that began to furnish something of interest. Shandara was picking his way down an unusually uninviting bit of slope when Ridging, who had already negotiated it, spoke up sharply.

"Shan! Look at the stars over the northern horizon! Isn't there some sort of haze? The sky around them looks a bit lighter." The other paused and looked.

"You're right. But how could that be? There couldn't suddenly be enough air at this level—gases don't behave that way. Van Maanen's star might have an atmosphere twenty meters deep, but the moon doesn't and never could have."

"There's *something* between us and the sky."

"That I admit; but I still say it isn't gas. Maybe dust—"

"What would hold it up? Dust is just as impossible as air."

"I don't know. The floor's only a few yards down—let's not stand here guessing." They resumed their descent.

The crater floor was fairly level, and sharply distinguished from the inner slope of the crater wall. Something had certainly filled, partly at least, the vast pit after the original explosion; but neither man was disposed to renew the argument about the origin of Lunar craters just then. They

scrambled down the remaining few yards of the journey and stopped where they were, silently.

There was something blocking vision; the horizon was no longer visible, nor could the stars be seen for a few degrees above where it should have been. Neither man would have had the slightest doubt about the nature of the obscuring matter had he been on Earth; it bore every resemblance to dust. It *had* to be dust.

But it couldn't be. Granted that dust can be fine enough to remain suspended for weeks or months in Earth's atmosphere when a volcano like Krakatoa hurls a few cubic miles of it aloft, the moon had not enough gas molecules around it to interfere with the trajectory of a healthy virus particle—and no seismometer in the last four weeks had registered crustal activity even approaching the scale of vulcanism. There was nothing on the moon to throw the dust up, and even less to keep it there.

"Meteor splash?" Shandara made the suggestion hesitantly, fully aware that while a meteor might raise dust it could never keep it aloft. Ridging did not bother to answer, and his friend did not repeat the suggestion.

The sky straight overhead seemed clear as ever; whatever the absorbing material was it apparently took more than the few feet above them to show much effect. That could not be right, though, Ridging reflected, if this stuff was responsible for hiding the features which should have been visible from the crater rim. Maybe it was thicker farther in. If so, they'd better go on—there might be some chance of collecting samples after all.

He put this to Shandara, who agreed; and the two started out across the hundred kilometer plain.

The surface was fairly smooth, though a pattern of minute cracks suggestive of the joints formed in cooling basalt covered it almost completely. These were not wide enough even to constitute a tripping danger, and the men ignored them for the time being, though Ridging made a mental note to get a sample of the rock if he could detach one.

The obscuration did thicken as they progressed, and by the time they had gone half a dozen kilometers it was difficult to see the crater wall behind them. Looking up, they saw that all but the brighter stars had faded from view even when the men shaded their eyes from the sunlit rock around them.

"Maybe gas is coming from these cracks, carrying dust up with it?" Shandara was no geologist, but had an imagination. He had also read most of the serious articles which had ever been published about the moon.

"We could check. If that were the case, it should be possible to see currents coming from them; the dust would be thicker just above a crack than a few centimeters away. If we had something light, like a piece of paper, it might be picked up."

"Worth trying. We have the map," Shandara pointed out. "That should do for paper; the plastic is thin enough." Ridging agreed. With some difficulty—spacesuit gloves were not designed for that purpose—he tore a tiny corner off the sheet on which the map was printed, knelt down, and held the fragment over one of the numerous cracks. It showed no tendency to flutter in his grasp, and when he let go it dropped as rapidly as anything ever did on the moon, to lie quietly directly across the crack he had been

testing. He tried to pick it up, but could not get a grip on it with his stiff gloves.

"That one didn't seem to pan out," he remarked, standing up once more.

"Maybe the paper was too heavy—this stuff must be awfully fine—or else it's coming from only a few of the cracks."

"Possibly; but I don't think it's practical to try them all. It would be smarter to figure some way to get a sample of this stuff, and let people with better lab facilities figure out what it is and what holds it off the surface."

"I've been trying to think of a way to do that. If we laid the map out on the ground, some of the material might settle on it."

"Worth trying. If it does, though, we'll have another question—why does it settle there and yet remain suspended long enough to do what is being done? We've been more than an hour coming down the slope, and I'll bet your astronomical friends of the past have reported obscurations longer lasting even than that."

"They have. Well, even if it does raise more problems it's worth trying. Spread out the map, and we'll wait a few minutes." Ridging obeyed; then, to keep the score even, came up with an idea of his own.

"Why don't you lay your camera on the ground pointing up and make a couple of time exposures of the stars? You could repeat them after we get back in the clear, and maybe get some data on the obscuring power of this material."

"Good enough." Shandara removed the camera from its case, clipped a sun shade over its lens, and looked up to find a section of sky with a good selection of stars. As usual, he had to shield his eyes both from sunlight and from the glare of the nearby hills; but even then he did not seem satisfied.

"This stuff is getting thicker, I think," he said. "It's scattering enough light so that it's hard to see any stars at all—harder than it was a few minutes ago, I'd say." Ridging imitated his maneuver, and agreed.

"That's worth recording, too," he pointed out. "Better stay here a while and get several shots at different times." He looked down again. "It certainly is getting thicker. I'm having trouble seeing you, now."

Human instincts being what they are, the solution to the mystery followed automatically and immediately. A man who fails, for any reason, to see as clearly as he expects usually rubs his eyes—if he can get at them. A man wearing goggles or a space helmet may just possibly control this impulse, but he follows the practically identical one of wiping the panes through which he looks. Ridging did not have a handkerchief within reach, of course, and the gauntlet of a spacesuit is not one of the best windshield wipers imaginable; but without giving a single thought to the action, he wiped his face plate with his gauntlet.

Had there been no results he would not have been surprised; he had no reason to expect any. He would probably have dismissed the matter, perhaps with a faint hope that his companion might not have noticed the futile gesture. However, there were results. Very marked ones.

The points where the plastic of the gauntlet actually touched the face plate were few; but they left trails all the way across—opaque trails. Surprised and still not thinking, Ridging repeated the gesture in an automatic

effort to wipe the smears of whatever it was from his helmet; he only made matters worse. He did not quite cover the supposedly transparent area with glove trails—but in the few seconds after he got control of his hand the streaks spread and merged until nothing whatever was visible. He was not quite in darkness; sunlight penetrated the obscuring layer, but he could not see any details.

"Shan!" The cry contained almost a note of panic. "I can't see at all. Something's covering my helmet!" The cartographer straightened up from his camera and turned toward his friend.

"How come? You look all right from here. I can't see too clearly, though—"

Reflexes are wonderful. It took about five seconds to blind Shandara as thoroughly as Ridging. He couldn't even find his camera to close the shutter.

"You know," said Ridging thoughtfully after two or three minutes of heavy silence, "we should have been able to figure all this out without coming down here."

"Why?"

"Oh, it's plain as anything—"

"Nothing, and I mean *nothing*, is plain right now."

"I suppose a map maker would joke while he was surveying Gehenna. Look, Shan, we have reason to believe there's a magnetic storm going on, which strongly suggests charged particles from the sun. We are standing, for practical purposes, on the moon's south magnetic pole. Most level parts of the moon are covered with dust—but we walked over bare rock from the foot of the rim to here. Don't those items add up to something?"

"Not to me."

"Well, then, add the fact that electrical attraction and repulsion are inverse square forces like gravity, but involve a vastly bigger proportionality constant."

"If you're talking about scale I know all about it, but you still don't paint me a picture."

"All right. There are, at a guess, protons coming from the sun. They are reaching the moon's surface here—virtually all of them, since the moon has a magnetic field but no atmosphere. The surface material is one of the lousiest imaginable electrical conductors, so the dust normally on the surface picks up *and keeps* a charge. And what, dear student, happens to particles carrying like electrical charges?"

"They are repelled from each other."

"Head of the class. And if a hundred-kilometer circle with a rim a couple of kilos high is charged all over, what happens to the dust lying on it?"

Shandara did not answer; the question was too obviously rhetorical. He thought for a moment or two, instead, then asked, "How about our face plates?"

Ridging shrugged—a rather useless gesture, but the time for fighting bad habits had passed some minutes before.

"Bad luck. Whenever two materials rub against each other, electrons come loose. Remember your rubber-and-cat-fur demonstrations in grade school. Unless the materials are of identical electronic make-up, which for practical purposes means unless they are the same substance, one of

them will hang onto the electrons a little—or a lot—better than the other, so one will have a negative net charge and the other a positive one. It's our misfortune that the difference between the plastic in our face plates and that in the rest of the suits is the wrong way; when we rubbed the two, the face plates picked up a charge opposite to that of the surrounding dust—probably negative, since I suppose the dust is positive and a transparent material should have a good grip on its electrons."

"Then the rest of our suits, and the gloves we wiped with in particular, ought to be clean."

"Ought to be. I'd like nothing better than a chance to check the point."

"Well, the old cat's fur didn't stay charged very long, as I remember. How long will it take this to leak off, do you think?"

"Why should it leak off at all?"

"What? Why, I should think—Hm-m-m." Shandara was silent for a moment. "Water *is* pretty wonderful stuff, isn't it?"

"Yep. And air has its uses, too."

"Then we're . . . Ridge, we've got to *do* something. Our air will last indefinitely, but you still can't stay in a spacesuit too long."

"I agree that we should do something; I just haven't figured out what. Incidentally, just how sure are you that our air will last? The windows of the regenerators are made, as far as I know, of the same plastic our face plates are. What'll you bet you're not using emergency oxygen right now?"

"I don't know—I haven't checked the gauges."

"I'll say you haven't. You won't, either; they're outside your helmet."

"But if we're on emergency now, we could hardly get back to the tractor starting this minute. We've got to get going."

"Which way?"

"Toward the rim!"

"Be specific, son. Just which way is that? And please don't point; it's rude, and I can't see you anyway."

"All right, don't rub it in. But Ridge, what *can* we do?"

"While this stuff is on our helmets, and possibly our air windows, nothing. We couldn't climb even if we knew which way the hills were. The only thing which will do us the least good is to get this dust off us; and that will do the trick. As my mathematical friends would say, it is necessary and sufficient."

"All right, I'll go along with that. We know that the material the suits are made of is worse than useless for wiping, but wiping and electrical discharge seem to be the only methods possible. What do we have which by any stretch of the imagination might do either job?"

"What is your camera case made of?" asked Ridging.

"As far as I know, same as the suits. It's a regular clip-on carrier, the sort that came with the suits—remember Tazewell's remarks about the dividends AirTight must have paid when they sold the suits to the Project? It reminded me of the old days when you had to buy a lot of accessories with your automobile whether you wanted them or not—"

"All right, you've made your point. The case is the same plastic. It would be a pretty poor wiper anyway; it's a box rather than a bag, as I remember. What else is there?"

The silence following this question was rather lengthy. The sad fact is that spacesuits don't have outside pockets for handkerchiefs. It did occur to Ridging after a time that he was carrying a set of geological specimen bags; but when he finally did think of these and took one out to use as a wiper, the unfortunate fact developed that it, too, left the wrong charge on the face plate of his helmet. He could see the clear, smooth plastic of the bag as it passed across the plate, but the dust collected so fast behind it that he saw nothing of his surroundings. He reflected ruefully that the charge to be removed was now greater than ever. He also thought of using the map, until he remembered that he had put it on the ground and could never find it by touch.

"I never thought," Shandara remarked after another lengthy silence, "that I'd ever miss a damp rag so badly. Blast it, Ridge, there must be *something*."

"Why? We've both been thinking without any result that I can see. Don't tell me you're one of those fellows who think there's an answer to every problem."

"I am. It may not be the answer we want, but there is one. Come on, Ridge, you're the physicist; I'm just a high-priced picture-copier. Whatever answer there is, you're going to have to furnish it; all my ideas deal with maps, and we've done about all we can with those at the moment."

"Hm-m-m. The more I think, the more I remember that there isn't enough fuel on the moon to get a rescue tractor out here, even if anyone knew we were in trouble and could make the trip in time. Still—wait a minute; you said something just then. What was it?"

"I said all my ideas dealt with maps, but—"

"No; before that."

"I don't recall, unless it was that crack about damp rags, which we don't have."

"That was it. That's it, Shan; we don't have any rags, but we do have *water*."

"Yes—inside our spacesuits. Which of us opens up to save the other?"

"Neither one. Be sensible. You know as well as I do that the amount of water in a closed system containing a living person is constantly increasing; we produce it, oxidizing hydrogen in the food we eat. The suits have driers in the air cyclers or we couldn't last two hours in them."

"That's right; but how do you get the water out? You can't open your air system."

"You can shut it off, and the check valve will keep air in your suit—remember, there's always the chance someone will have to change emergency tanks. It'll be a job, because we won't be able to see what we're doing, and working by touch through spacesuit gauntlets will be awkward as anything I've ever done. Still, I don't see anything else."

"That means you'll have to work on my suit, then, since I don't know what to do after the line is disconnected. How long can I last before you reconnect? And what do you do, anyway? You don't mean there's a reservoir of liquid water there, do you?"

"No, it's a calcium chloride drier; and it should be fairly moist by now—You've been in the suit for several hours. It's in several sections, and I can take out one and leave you the others, so you won't suffer from its

lack. The air in your suit should do you for four or five minutes, and if I can't make the disconnection and disassembly in that time I can't do it at all. Still, it's your suit, and if I do make a mistake it's your life; do you want to take the chance?"

"What have I to lose? Besides, you always were a pretty good mechanic—or if you weren't, please don't tell me. Get to work."

"All right."

As it happened, the job was not started right away, for there was the minor problem of finding Shandara to be solved first. The two men had been perhaps five yards apart when their face plates were first blanked out, but neither could now be sure that he hadn't moved in the meantime, or at least shifted around to face a new direction. After some discussion of the problem, it was agreed that Shandara should stand still, while Ridging walked in what he hoped was the right direction for what he hoped was five yards, and then start from wherever he found himself to quarter the area as well as he could by length of stride. He would have to guess at his turns, since even the sun no longer could penetrate the layer of dust on the helmets.

It took a full ten minutes to bump into his companion, and even then he felt undeservedly lucky.

Shandara lay down, so as to use a minimum of energy while the work was being done. Ridging felt over the connection several times until he was sure he had them right—they were, of course, designed to be handled by spacesuit gauntlets, though not by a blindfolded operator. Then he warned the cartographer, closed the main cutoffs at helmet and emergency tanks to isolate the renewer mechanism, and opened the latter. It was a simple device, designed in throwaway units like a piece of electronic gear, with each unit automatically sealing as it was removed—a fortunate fact if the alga culture on which Shandara's life for the next few hours depended was to survive the operation.

The calcium chloride cells were easy to locate; Ridging removed two of the half dozen to be on the safe side, replaced and reassembled the renewer, tightened the connections, and reopened the valves.

Ridging now had two cans of calcium chloride. He could not tell whether it had yet absorbed enough water actually to go into solution, though he doubted it; but he took no chances. Holding one of the little containers carefully right side up, he opened its perforated top, took a specimen bag and pushed it into the contents. The plastic was not, of course, absorptive—it was not the first time in the past hour he had regretted the change from cloth bags—but the damp crystals should adhere, and the solution if there was any would wet it. He pulled out the material and applied it to his face plate.

It was not until much later that he became sure whether there was any liquid. For the moment it worked, and he found that he could see; he asked no more. Hastily he repeated the process on Shandara's helmet, and the two set out rapidly for the rim. They did not stop to pick up camera or map.

Travel is fast on the moon, but they made less than four hundred meters. Then the face plates were covered again. With a feeling of annoyance they stopped, and Ridging repeated the treatment.

This time it didn't work.

"I supposed you emptied the can while you were jumping," Shandara remarked in an annoyed tone. "Try the other one."

"I didn't empty anything; but I'll try." The contents of the other container proved equally useless, and the cartographer's morale took another slump.

"What happened?" he asked. "And please don't tell me it's obvious, because you certainly didn't foresee it."

"I didn't, but it is. The chloride dried out again."

"I thought it held onto water."

"It does, under certain conditions. Unfortunately its equilibrium vapor pressure at this temperature is higher than the local barometer reading. I don't suppose that every last molecule of water has gone, but what's left isn't sufficient to make a conductor. Our face plates are holding charge again—maybe better than before; there must be some calcium chloride dust on them now, though I don't know offhand what effect it would have."

"There are more chloride cartridges in the cyclers."

"You have four left, which would get us maybe two kilos at the present rate. We can't use mine, since you can't get them out; and if we use all yours you'd never get up the rim. Drying your air isn't just a matter of comfort, you know; that suit has no temperature controls—it depends on radiation balance and insulation. If your perspiration stops evaporating, your inner insulation is done; and in any case, the cartridges won't get us to the rim."

"In other words you think we're done—again."

"I certainly don't have any more ideas."

"Then I suppose I'll have to do some more pointless chattering. If it gave you the last idea, maybe it will work again."

"Go ahead. It won't bother me. I'm going to spend my last hours cursing the character who used a different plastic for the face plate than he did for the rest of these suits."

"All right," Tazewell snapped as the geophysicist paused. "I'm supposed to ask you what you did then. You've just told me that that handkerchief of yours is a good wind-shield wiper; I'll admit I don't see how. I'll even admit I'm curious, if it'll make you happy."

"It's not a handkerchief, as I said. It's a specimen bag."

"I thought you tried those and found they didn't work—left a charge on your face plate like the glove."

"It did. But a remark I made myself about different kinds of plastic in the suits gave me another idea. It occurred to me that if the dust was, say, positively charged—"

"Probably was. Protons from the sun."

"All right. Then my face plate picked up a negative, and my suit glove a positive, so the dust was attracted to the plate."

"Then when we first tried the specimen bag, it also charged positively and left negative on the face plate."

"Then it occurred to me that the specimen bag *rubbed by the suit* might go negative; and since it was fairly transparent, I could—"

"I get it! You could tie it over your face plate and have a windshield you could see through which would repel the dust."

"That was the idea. Of course. I had nothing to tie it with; I had to hold it."

"Good enough. So you got a good idea out of an idle remark."

"Two of them. The moisture one came from Shan the same way."

"But yours worked." Ridging grinned.

"Sorry. It didn't. The specimen bag still came out negative when rubbed on the suit plastic—at least it didn't do the face plate any good."

Tazewell stared blankly, then looked as though he were about to use violence.

"*All right!* Let's have it, once and for all."

"Oh, it was simple enough. I worked the specimen bag—I tore it open so it would cover more area—across my face plate, pressing tight so there wouldn't be any dust under it."

"What good would that do? You must have collected more over it right away."

"Sure. Then I rubbed my face plate, dust rag and all, against Shandara's. We couldn't lose; one of them was bound to go positive, I won, and led him up the rim until the ground charge dropped enough to let the dust stick to the surface instead of us. I'm glad no one was there to take pictures, though; I'd hate to have a photo around which could be interpreted as my kissing Shandara's ugly face—even through a space helmet."

THE END

IN TIMES TO COME

It may seem a little hard to believe . . . but Poul Anderson actually succeeds in stepping up the level of magnificent comic-logic yarn-spinning in the next instalment of "High Crusade," which will, of course, be with us next month. I sincerely regret the absolute impossibility of running that lovely yarn as a single piece—but it simply can't be done.

Featured next month on the cover will be "Adaptation," by Mack Reynolds. Reynolds—who's been visiting more than one cultural area of this world—has some comments on human cultures. Like Poul Anderson, he holds that "ignorant" and "stupid" are not infrequently confused—which can be a very, very serious mistake. Those ignorant savages, now . . . ripe for the exploitation of a millennium-more-advanced Earth culture . . .

THE EDITOR.

BEYOND THE PHYLA

By ISAAC ASIMOV

You hear a lot of malarky about there being no such thing as "general superiority." The whole history of evolution is, very simply, the search for, and achievement of, general superiority. Every time any species sought to win the race by special superiority . . . well, take a look at what specialization yielded!

IN my recent article—"March of the Phyla"—I concluded that there were two broad divisions—"phyla"—of living creatures that were more advanced than any others, in the sense that they had the greatest control over their environment. These two were the phylum, Arthropoda—or "arthropods," including lobsters, spiders, centipedes, insects and so on—and the phylum Chordata—or "chordates," including fish, snakes, birds, men and so on.

I carefully did not try to make a decision as to which of the two was *the* most advanced. On the one hand, being men, and, therefore, chordates, it seems natural to us that the chordates are the more advanced. On the other hand, it is undeniable that the mass of arthropod life in existence is far greater than the mass of chordate life.

Also, man may be ruler of the Earth, but he has certainly failed to control those insects that annoy him, despite heroic efforts. Annoying chordates, on the other hand, have generally gone down under the human onslaught; sometimes with embarrassing rapidity.

Perhaps that is the reason many of us have the unhappy feeling that when and if chordates—including even man—pass from the scene, insects—the most successful of the arthropods—will still be proceeding in quiet business-as-usual fashion.

Despite any uncertainties we may have, however, if we restrict ourselves to the chordate individual and the arthropod individual, it is strictly no contest—with the chordate the obvious winner.

To see why, consider life on land.

Land-life is a rather minor offshoot of life in general, since something like five-sixths of the total mass of living matter dwells in the oceans. However, control of the environment, which is the measure of the "advancement" of an organism is potentially possible to a much greater extent on land than in the sea. Consequently, land-life has the odds very much in its favor in the competition for dominance. Why this is so, is simply explained.

Life in the sea is surrounded by water, while life on land is surrounded by air. Water is about seventy times as viscous as air at ordinary temperatures and is that much more difficult to move through. There's the key point.

A creature capable of rapid motion is in better control of its environment and therefore more advanced—all other things being equal—than a creature not capable of rapid motion. But a sea creature designed for rapid motion

must be streamlined, otherwise an impractical amount of energy is consumed in overcoming watery resistance. Examples of streamlining are to be seen at a glance in the sharks and fish.

Creatures on land, however, may be designed for rapid movement through the much less viscous air without being streamlined. Still, when the descendants of a line of non-streamlined land creatures return to the sea, streamlining sets in. You can see a little of it in otters and ducks, more of it in seals and penguins, and the near perfection of it in the porpoises and whales.

The disadvantage of streamlining is this: it discourages the existence of appendages which would break streamlining and destroy efficiency of motion. But it is by use of appendages that creatures can best handle the environment and bend it to their will. An opossum uses its tail to swing from a branch, an elephant its trunk to manipulate large and small objects, a raccoon its paws, a monkey its hands and so on.

In short, a streamlined creature cuts itself off from attack upon the environment. The whale is the most dramatic example of this. The whale is one of the two types of creatures with a brain that is larger than the human brain. The other type is the elephant, an undeniably intelligent animal.

The brain of the whale, unlike that of the elephant, is not only larger than a man's brain, it is also more intensely convoluted. There is a reasonable possibility, therefore, that a whale might be—potentially, at least—more intelligent than a man. After all, porpoises and dolphins, small relatives of the whale are undeniably intelligent, more so than most mammals, and a porpoise to a sperm whale, may be as a monkey to a man.

But suppose a whale were potentially more intelligent than a man, how could it show that intelligence? It has a tail and two flippers that are perfectly adapted for powerful swimming and for nothing else. It has no appendages with which to manipulate the outside world and, thanks to the necessity for streamlining, can have none. What intelligence the whale has must remain strictly potential; a prisoner of the viscosity of water.

Or consider the giant squid, a member of the phylum, Mollusca. Certainly in all the world there is no more highly advanced creature that is neither arthropod nor chordate. In some ways, in fact, it goes all arthropods and chordates one better. It has large eyes, for instance, larger than any other in the world, similar to and possibly potentially better than the eyes independently invented by the chordates.

The squid has ten appendages in the form of tentacles which can writhe like so many snakes, each exquisitely sensitive and equipped with vacuum disks for tight grips. Yet these do not affect the streamlining for when the squid chooses to put on speed, its streamlined mantle cleaves the water while the tentacles trail behind without interfering. In fact, since the squid moves rapidly by jet propulsion it doesn't even need the fins or flippers that in sharks, fish or whales unavoidably break the perfect pattern of streamline.

But the viscosity of water is nevertheless victorious, even over the super-flexible arrangement of the squid. Those tentacles must move through water when they manipulate their environment and can only do so in slow-motion. (Try swinging a bat under water and you'll see what I mean.)

To summarize then, the appendage is rare in the sea, and the quickly-moving appendage nonexistent. The quickly-moving appendage is, however,

common among land creatures, and it is that which makes land species, not sea species, lords of the Earth.

However, there are also disadvantages involved in living on land. One arises in connection with gravity. In the sea, thanks to the buoyancy of water, gravity is virtually nonexistent. It is almost as easy for a fish to swim upward as downward.

On land, however, the pull of gravity is just about undiluted by the tiny air-buoyancy effect for any creature at the multicellular level. All living creatures invading the land must cope with it one way or another.

Until arthropod and chordate came along, all types of animal life that invaded the land were defeated by gravity. They coped by surrendering and moved on land only by slowly crawling, with the body in contact with the surface at all or almost all points. Watch an earthworm.

The development of shells by mollusks, which in the sea represented an advance, was, on land, actually a handicap. The land snail must not only fight the effect of gravity on its own body; it must carry the weight of a shell upon its back.

Now a crawling creature which needs all its energy to move in slow, ungainly fashion can scarcely develop fast-moving appendages. Therefore, the prime advantage of land-life is lost for them. Below the level of arthropod and chordate, then, the most advanced forms of life are in the sea.

To develop fast-moving appendages, a land creature needs supporting legs to lift the main portion of the body clear of the ground in defiance of gravity. But legs of soft tissue alone will never support a body of even moderate bulk. Legs need stiffening. Both arthropods and chordates include types of creatures with stiffened legs; and to decide which of the two types is more advanced, let's find out which type uses the more efficient type of stiffening.

In the case of the arthropod, the stiffening is on the outside of the leg in the form of chitin. In the case of the chordate, it is on the inside of the leg in the form of bone. In general an exoskeleton—one on the outside—is the better for purposes of defense. An endoskeleton—one on the inside—is the better for structural strength. (Thus, a knight wears his armor on the outside and a skyscraper wears its steel girders on the inside.)

Furthermore, an exoskeleton limits growth. If the soft tissues within grow, the hard unyielding exoskeleton must be discarded, or growth must stop. In the arthropods, the exoskeleton is periodically discarded and replaced by a new and larger one. A great deal of vital energy goes into the perpetual manufacture of exoskeletons. What's more, during the interval of molting, the organism is fairly defenseless.

An endoskeleton does not limit growth. The bones within may freely be extended by accretion and the soft tissue about it yield and, in fact, matches the growth easily.

The chordate individual can, therefore, grow larger than the arthropod

The elephant went in for defense-through-size—which meant he needed all four limbs to carry his tons around. The effort to compensate by an overdeveloped nose didn't prove adequate.

individual and be stronger. Chordate muscles, slung on internal beams rather than on an external shell are more efficient. By all odds, the larger, stronger, faster chordate has better control of its environment and is, therefore, more advanced than the arthropod.

(Don't be fooled by stories to the effect that grasshoppers can jump so many times their own length and that ants can lift so many times their own weight and that if either were the size of a man it could do wonders. Actually, if either were the size of a man and could remain alive, it is quite certain that a grasshopper could not drive his bulk in a jump that was as long as a man's, nor could an ant lift as much as a man could.)

To be sure, not all chordates are equally advanced. The phylum, Chordata, is divided into nine classes and of these the first three include degenerate descendants of very primitive chordates. These now-living descendants rather resemble worms and mollusks outwardly and only a zoologist would find reason for placing them in the same phylum with ourselves.

Nevertheless, these primitive creatures—or their more respectable ancestors—first stiffened their bodies with an inner rod of cartilage—a substance resembling chitin in terms of flexibility and toughness, though quite different chemically.

In addition, the first chordates apparently invented segmentation as well as hemoglobin—both of which were earlier and independently invented by the Annelida, a phylum to which the earthworm belongs. They also made entirely novel advances by developing a liver in which many of the chemical tasks of the body were efficiently concentrated, and gill arches, which made respiration more efficient.

But this, obviously, is not particularly designed to make gravity-conquering land-life possible.

The next class of chordates, Cyclostomata—of which the lamprey is the most familiar example—made a step in that direction by extending the one stiffening rod of cartilage into a complete skeleton, thus much strengthening the body and making it far less wormlike. In addition, they invented eyes—independently of the mollusk invention. The circulatory system also underwent improvements; a two-chambered heart was developed to drive the blood through the blood vessels and blood cells were developed in which hemoglobin might be kept. Both advances made the transport of food, oxygen, and waste matter more efficient.

Next comes the class of Pisces. This is divided into several subclasses of which the most primitive, Elasmobranchii—sharks, et cetera—invented some of our most useful conveniences; jaws and teeth, and two pairs of limbs.

The skeletons of both the lampreys and the sharks, while complete, are only of cartilage. This is sufficient stiffening for life in the water—the sharks are quite successful at it, too—but is not strong enough to support a moderately bulky creature against the gravitational force it would meet on land.

But another Piscian subclass, Teleostei, invented a method whereby the skeleton was reinforced by inorganic salts such as calcium phosphate. Cartilage was thus converted to bone and the Teleostei are the "bony fish."

Further changes are necessary for land-life. An organism must be able

to utilize the oxygen of the atmosphere directly. In this direction, the teleostians had invented an air bladder by which it could increase or decrease its buoyancy at will, thus helping in vertical swimming. In some members of another Piscian subclass, *Crossopterygii*—the "lungfish"—the air-bladder became a lung.

The crossopterygians are an example of the fact that it is often a loser in the game of life that makes a major advance. The crossopterygians were, for one reason or another, less successful at coping with their environment than the teleostians were. Most of the crossopterygian species are now extinct. Some descendants still exist by learning how to make do with environments so undesirable that the teleostians had no reason to follow them there, successful as the latter were in the lush pastures of the open sea. The crossopterygians retreated to stagnant water, to the oceanic abyss—and to the land. We are descended from the third group.

The next class of Chordata is *Amphibia*—of which frogs and toads are the best-known modern representatives. They made the transition. Amphibian lungs, working full-time in adult life, were given a circulatory system of their own, which made a three-chambered heart a necessity. In addition, the amphibians invented the ear. (In general, air being more transparent than water, sense-impressions reach out farther into the environment on land than in the sea. Land creatures could more profitably sharpen their senses than sea creatures could. Sharper senses imply an increase in control of the environment and this, too, helps make land-life more advanced than sea-life.)

So it came about that amphibians were the first chordates to invade land, raise their bodies up on legs, and walk. They walked slowly and clumsily, to be sure, but they walked.

Toward the end of the paleozoic era, the chordate amphibians and the arthropod scorpions and insects competed on land and for the first time, a chordate victory began to show signs of inevitability.

But amphibians were still tied to the sea, or at least to a watery environment of some sort, during the period of birth and early development. It was the next class, *Reptilia*—the reptiles—that made the crucial invention—an egg that could be hatched on land.

Such an egg had first to be enclosed by a membrane which was porous to gases—so that the developing embryo could breathe—but which would retain water so that the embryo would not dry up. In order for such an egg to be fertilized, fertilization must take place before the shell was developed and hence sperm had to be released within the female and not merely over the already-laid eggs.

Again, the egg had to be large enough to contain the food and water needed by the embryo during the entire period of development. This meant the embryo must develop special membranes with which it might handle the food contents of the egg.

The reptiles developed all this and became truly a land animal. Some of them also put the final touches on the circulatory system by developing the fourth—and last—chamber of the heart so that two complete and co-ordinating blood pumps existed.

The reptiles reached their heights in the Mesozoic Era when giant dinosaurs shook the earth.

But the conquest of gravity meant that only one of the disadvantages of land-life had been conquered. There was another one: temperature variation.

The temperature of the sea is virtually constant. Through almost all of its volume this constant temperature is fairly close to the freezing point. In a thin surface skin in the tropics, it is higher but, in the restricted area, still moderately constant.

Once a creature adapts itself to the temperature of its region of the sea, it needs no further adaptation to cope with changes.

On land, however, temperature varies widely. Land creatures can try to avoid that by living under rocks, in crevices, in burrows or in caves, by moving south in the winter and north in the summer, by hibernating through cold weather or by estivating through warm weather. These are all withdrawals, however, and avoidance mechanisms.

Success lies always in the direction of the offense. It was necessary to invent a device which would ensure constant temperature within the body whatever—within reason—the temperature might be outside the body.

Two different groups of early reptiles made the necessary discovery independently, even before the great age of Reptiles had begun. One group developed into the class of Mammalia—mammals, like us—and the other, somewhat later, into the class of Aves—birds. Both had internal air-conditioning, a way of storing heat in such controlled fashion that body temperature was kept within narrow limits.

In both cases, the body temperature was maintained considerably higher than the usual temperature of the environment. There was reason for this, since chemical reactions—and therefore the bodily movements and metabolism that result—speed up with higher temperature. The highest temperature at which there is not too much damage to delicate protein molecules therefore implies best control of the environment and highest advancement.

But to maintain a high body temperature meant cutting down the rate of loss of heat to the atmosphere. This was done by keeping a layer of relatively motionless air next the body—still air being one of the best insulators.

The birds do this by trapping air among a set of modified scales called feathers; mammals by trapping it among a set of modified scales called hairs. (The feathers are the more efficient of the two, by the way.)

The birds took to the air, rediscovering three-dimensional travel, which the amphibians had lost on leaving the sea. In doing so, however, birds found that the aerodynamic facts of life limited their size drastically, thus also limiting their potentialities for advance. Flight also involved the thorough commitment of one pair of limbs to the formation of wings—beautiful for their job but for nothing else.

So the future lay with the mammals which retained all four limbs relatively uncommitted and retained, furthermore, the possibility of large size.

The advantages of mammals over reptiles were, eventually, decisive. By possession of a constant internal temperature, they could be in full activity during the night and during the cold seasons, when reptiles were sluggish and at a relative disadvantage.

The possession of hair, moreover, meant the exposure of a soft skin to the environment and this is important.

The early chordates made a number of attempts to add, over and above

the internal stiffening of bone, an external shield of some sort. The temptation to seek out protection is apparently almost irresistible. The earliest fish were armor-plated as were the early amphibians and reptiles.

The cost was too high in every case. The armored creatures only succeeded in making mollusks of themselves. Armor decreased the all-important mobility; it substituted passive defense for offense, which was unhealthy; and it put up a barrier between the outer world and the inner organism. The armored creatures invariably fell before the onslaughts of the unarmored ones. The last survivors today are the turtles, which are the most primitive and least successful of the large groups of reptiles in existence today.

By converting scales into hair, the mammals became that much more sensitive to their environment, that much more able to respond to it, and by responding, control. Some early mammals made one last attempt to develop an external armor and went under. Their remaining descendants are the armadillos.

Temperature control did one more thing for mammals—and birds, too. It made necessary the invention of extended child care. Or, if you care to be more dramatic, warm blood invented mother-love.

Temperature control is more easily maintained in a large organism than in a small one. (All parts of the mass of an organism produce heat, but heat is lost only at the surface. A small creature has more surface per unit volume, hence loses heat at a greater rate.) This means that the most critical time in the life of a mammal, as far as heat-control is concerned, is when he is smallest; when he is young or, most of all, when he is an embryo.

A sea creature can leave its eggs where laid and go away. The constant temperature of the sea will take care of it. A land creature without temperature control can take rudimentary precautions. A turtle, for instance, might bury its eggs in the warm sand and leave matters to the somewhat uncertain sun.

A land creature with temperature-control—a bird, for instance—can't fool around. Its eggs require not only warmth but a certain constant temperature. There is not enough living tissue within the egg to supply that temperature, so it must be supplied from without; specifically, from the mother's body.

Under conditions of temperature control, then, survival of the species requires the development of instincts that will keep birds building nests, incubating eggs to the hatching stage, and feeding the young—all at considerable inconvenience to themselves.

The result, however, is a sharp decrease in infant mortality among birds as compared with reptiles. Inasmuch as the young bird is relieved of certain environmental stresses to which young reptiles are subjected, this represents an evolutionary advance in birds over reptiles.

The mammals go even further—in stages. The class, Mammalia, is divided into three subclasses. The first is Prototheria, which includes the duck-bill platypus. These still show many reptilian characteristics and are imperfectly warm-blooded, but they have hair, which no true reptile has.

The Prototheria lay eggs, as reptiles do, but the embryo has proceeded in its development quite a way by the time the egg is laid, so that the incubation period, with all its special dangers, is cut down.

Furthermore, the Prototheria are the first to invent a special food supply for the infant, adjusted perfectly to its nutritional needs. This is milk, formed in the body of the mother and fed to the child via special "mammary glands"—whence the word "Mammalia."

The next subclass of Mammalia is Metatheria which includes marsupials such as opossums and kangaroos. Here another step is taken. The laying of the egg is so long delayed that it hatches first. It is an embryo at an early stage in its development that actually emerges. These embryos have just enough strength to make their way to the mammary-glands of the mother, which are usually enclosed in a special pouch. In this pouch, the young complete their development.

The third and last subclass of Mammalia is Eutheria, or what we call the "placental mammal." Here the young develop to a much greater extent within the body of the mother. A special organ, the placenta, is developed, through which the developing embryo can absorb food from the mother's circulatory system and into which it can discharge wastes. This makes longer gestation periods possible; periods long enough in some cases so that the young are born almost capable of caring for themselves.

The development of mammary glands in the platypus reduces the environmental stress on the young to a level even below that among the birds. The pouch among the marsupials lowers it further, and the placenta among the placentals lowers it still further.

The comparison shows itself plainly in the fact that where the three subclasses of mammals competed directly, the placentals won out. Except for a few species of opossums in the Americas—where they persist by sheer powers of fertility—the only egg-laying mammals and marsupials that remain are those in Australia. Australia separated from other land areas before the placentals developed. Elsewhere, where placentals entered, the others went out.

The placental mammals are thus the current rulers of Earth.

Again, not all placental mammals are equally advanced. One thing that marks them off from one another is the development of the brain. Even the simpler mammals surpass in brain-power the rest of organized life, but some mammals are brainier than others.

The good brain-development of the mammals is probably the consequence of life on dry land, on soft skin and the improvement of the sense organs generally. Mammals were, in consequence, buried under a large mass of sense impressions and there was consequently survival value in the further development of an accounting system—so to speak—to sort out those impressions and devise responses.

But one thing further is needed. There is still the question of appendages, which is the greatest gift of life on land. But to be maximally useful, an appendage must be useful in a variety of ways. There is always the danger of over-specialization.

Thus, I have mentioned the wing of the bird. It is a fast-moving appendage, but it can do only one thing. Similarly, the marvelously organized legs of horses, deer and antelope are excellent devices for outracing the enemy, but they are no longer useful for anything else.

On the other hand, the raccoons and bears walk flat-footedly on their

heels in primitive fashion—as we ourselves do—and their paws can be used for a variety of tasks. The members of the dog family and also some of the rodents retain the ability to use their paws as exploring devices. The elephant has developed a trunk that is the nearest thing any land creature owns to the tentacle of a squid.

The use of any such appendage increases the number of sense-impressions the animal must handle. Again the brain enlarges and its ability intensifies. (The whale is an exception; it has a large complicated brain with no generalized appendages. Perhaps its brain is a legacy from an intelligent land-living ancestor—nothing is known of the ancestors of whales, after all. Or perhaps it is only a response to the need for co-ordinating fifty to one hundred fifty tons of living matter.)

Obviously, the variously-useful appendage reaches a climax in the order of Primates—the monkeys, apes and us—in which at least two, and sometimes all four, of the limbs end in hands in which the individual fingers are capable of more or less independent motions. In the more advanced members of the Primates, one of the fingers, the thumb, is well developed and faces the other four, converting the hand into a possible pincer.

The primates are, not surprisingly, the brainiest of the mammals, and man, with the best-developed hand, is, not surprisingly, the brainiest of the Primates.

By using his brains, man was able to extend the two most fundamental inventions of land-life generally. He learned to control fire and thus extended the notion of warm-bloodedness. Other mammals and birds might control the internal temperature, man controlled the external temperature as well. Man also developed the systematic use of tools, which equipped him with artificial fast-moving appendages, each of which might be thoroughly specialized. He gained all the advantages of specialization without abandoning any of the advantages of nonspecialization.

And so man is the lord of the universe and—

Where do we go from here?

It is possible to imagine a bigger and better man, a “superman,” but that need not be the answer. Bigger and better dinosaurs just ended in extinction. Bulk alone is not everything. Neither is brainpower alone.

Actually, multicellularity may be played out. It may be that the multicellular organism has reached its limit. There has been no new phylum of organisms established in perhaps 600,000,000 years. Within the phylum of Chordata—the last-established—there has been no new class established in at least 250,000,000 years. Within the class of Mammalia—the most advanced of the chordates—nothing better than the placental mammal has been established in 100,000,000 years.

The great experiments may be over. What we are now facing is merely a refinement and a re-refinement of existing experiments.

But all this has happened once before.

A billion years ago, one-celled life had reached its peak. After many victories, such as the discovery of food storage and of photosynthesis, cells

The horse and antelope families specialized in speed-for-defense. Mobility—but, like the bird family, it cost them dexterity.

reached their limits. Evolution came to a dead end, or would have but for an entirely new breakthrough. Cells developed into cell colonies and then into multicellular organisms.

Now multicellularity has reached its dead end, too. Is there room for a new breakthrough? Can there be, once again, a new combination to a higher order of creature, a multi-organismic being. Such a combination must be more than merely physical, since physical combination would just make a larger multicellular organism. (In fact, the physical combination of organisms was tried, after a fashion, with the invention of segmentation. It was an advance but not nearly as fundamental a one as multicellularity.)

Fortunately, we have examples of nonphysical combinations of multicellular organisms.

Many varieties of creatures herd together in groups that act with a certain primitive co-ordination. They move together, feed together. If one is frightened, all flee. They may even combine for protection against a common enemy—though generally they merely run and devil take the hindmost. Or they may combine to hunt prey and then, often, quarrel over the spoils.

Such herds, or packs, or schools are the equivalent of cell colonies on the cellular level. Although it may be convenient for groups to keep together, it is not vital. Each individual in the herd can, if necessary, survive on its own.

We must look for something more than that.

In my last article, I used one main criterion to distinguish between a multicellular organism and a mere cell colony. In a multicellular organism, individual cells become so specialized that they can no longer live independently and the component cells are subordinated to the group to the point where only group-consciousness exists.

No group of organisms display these characteristics to the full, but there are signs of beginnings. The clearest cases are among the phylum, Arthropoda, and in its most advanced and most recently established class—Insecta, the insects.

The three main groups of "social insects" are the bees, the ants—both belonging to the order, Hymenoptera—and the termites—belonging to the order, Isoptera. All three display specializations among constituent organisms just as multicellular organisms display specializations among constituent cells. In the case of termites, the specializations go so far as to make life impossible for certain individuals outside the society—one of the hallmarks of a true multi-organismic creature. The termite queen cannot live without her attendants. Termite soldiers have mandibles so large they cannot feed themselves. They must be fed by workers.

Furthermore, such societies are more advanced than any individual organism, not only of their own type but of any type. A society of even primitive individuals can beat even a very advanced individual who happens to be on his own. When the army ants go marching, there is only one way the big-game hunter—elephant-gun and all—can save himself. He has to get out of the way, and fast.

There is a classic story called "Leiningen and the Ants" which tells of a plantation owner who found his land in the way of a marching column of army ants and decided to stand his ground and fight. Leiningen was a most

superior individual, brave, resourceful, intelligent and he fought like a demon. He managed just barely to get out of the fight with his life.

You might think the odds were terrific—millions of ants against one human—but you'd be wrong. The odds were exactly even numerically; *one* man versus *one* ant society.

To be sure, lots of individual ants were killed but that didn't affect the ant-society. Leiningen lost skin and blood, trillions of his individual cells, but he recovered and did not feel the loss.

Outside the class of insects and the phylum of arthropods, there is only one example of a society that begins to be more than an organism-colony. That is, of course, the human society. It includes specialized individuals—not physically specialized, to be sure, but mentally specialized. Some of them are so specialized they cannot live outside the society—and there is the hallmark again.

I, for instance, am city-bred and have lived—with moderate success—as part of a complex society all my life. I eat only too well, alas, but I cannot raise food; I have no experience in gathering food, I cannot even cook. I drive a car, but do not even know how to lift the hood. I own a house, but cannot repair any part of it. I watch television and use a number of appliances, including an electric typewriter, but am helpless in the face of electrical wiring.

Without the continuing and intensive help of other members of the human society, I would not survive long. Alone on Robinson Crusoe's island, I could only hope for a quick death in preference to a slow one. I think there are millions like me.

But now what is it that holds a society together; a true society where the component individual is willing to die for the good of the society. In the case of the insects, it is something we call "instinct" a compulsive, robot-like behavior that deprives the individual insect of choice of action. The individual insect is not only *willing* to die for the group, he *cannot* do anything else.

But what holds together a human society? Certainly not instinct. The nearest thing we have to an instinct in the matter is one which says, "To hell with the others. Cut and run." Often, this instinct is obeyed. The surprising thing is that often it is not obeyed.

I said earlier that intelligence was not enough in itself. Obviously, if it is joined to other qualities that are disadvantageous, extinction will follow. An intelligent animal that is too limited in the climate it can tolerate, or the food it can eat, or the parasites it can resist, is not going to succeed. The elephant and the great apes are examples of intelligent failures.

But when the first man-ape rose to his hind legs what made him a success when the gorilla was and is a failure?

I say that for hundreds of thousands of years, the early ape-men were on the borderline of failure. It was the crucial breakthrough of the formation of a tribal society that really set him on the road to mastery. Not merely packs, mind you, after the fashion of baboons, but a true society in which the whole was something more than the sum of the parts.

What made this possible, it seems to me, was the development of a means of communication that was complex enough and flexible enough to express

abstract ideas—to be something more than a mere squeal of fright or a simple warning cry.

By means of such communication—peculiar, as far as we know, to Homo sapiens—the amassed learning of one generation could be passed on to another. A young man absorbed in his youth what had taken an old man all his life to learn, and then the young man went on to learn more on his own. A new and larger body of knowledge was passed on to the generation after.

But with learning from the old came a reverence for the old; a new feeling that only human beings could have—tradition.

"This is the way things are done; this is the way things have always been done; this is the way our ancestors said it should be done; and because their spirits watch us and must not be angered, this is the way things *must* and *will* be done."

There is no use belaboring the point. We all know the power of tradition. It will hold a society together almost as firmly as instinct will. Call it "duty" or "patriotism" or "altruism" and any one of us can bring himself or herself to the point where he or she will give up individual life for the good of the group—which might be a small one called the family, a larger one called the nation, or a still larger one called mankind.

And if it was oral communication that launched the tribe and the first cultures; it was written communication that launched the cities and the first civilizations.

But are the city and the ant-hill the final expression of the multi-organismic being? It seems to me most certainly not. Both are only at the beginnings of society-potential.

The insect societies have succeeded, much more than has the human society, in physically specializing their members and in generalizing consciousness from the individual to the society. However, their method of doing this has cost them flexibility. Each individual insect in the society may make only the most limited responses to given stimuli.

The human society has specialized far less and has retained far more of individuality, but it has compensated for that by retaining a most successful flexibility.

The next step, it seems to me, would be the combination of the two—a society which combines an insect-like consciousness of the whole with a humanlike flexibility.

What type of organism, then, will attain this next major step in evolution?

To answer the question, let's look at the overall record of evolution so far. All through evolutionary history, it seems, once a particular type of organism has made a major advance, it is a sub-type of that type and then a sub-sub-type of that sub-type that makes the next major advances. There is no coming from behind in evolution.

In other words, once the chordates are evolved and by dint of internal skeletons prove to be clearly more in control of the environment than are

The Primate, even the gorilla, is remarkably unspecialized. Whales, elephants, and dolphins have brains larger than his. He's so primitive he retains five toes on each limb, unlike the highly evolved zebra with only one. About the only thing he's lost is the tail. But he's retained mobility, agility, and dexterity.

the mollusks, the die is cast. Further evolution merely increases the lead of chordates generally over mollusks generally. In the same way, land chordates increased their lead over sea chordates, mammals increased their lead over reptiles and humans over nonhumans. No group, having once relinquished the lead, ever gave rise to descendants that regained the lead.

Thus, at the phylum level, Chordata and Arthropoda are clearly in first and second place, respectively, from the moment of first clear-cut development half a billion years ago or so, and have never relinquished those positions. They are less in danger of relinquishing the lead now, in fact, than they have ever been before; a lead that is so secure that no new phyla have even been tried ever since the rise of the Chordates.

Both phyla are divided into classes. Within Chordata, Mammalia lead all other classes. Within Arthropoda, Insecta lead all other classes. The mammals and insects have been increasing their lead ever since their first clear-cut development and are in less danger of losing it than ever before.

This process continues, as shown in the accompanying figure, where the arrows do *not* indicate lines of descent but only the direction of increasing control of the environment. An underlining of a group of organisms symbolizes "dead end."

On the past record, then, it would seem that the next step would have to be taken by subdivisions of the "winners" of the last step; subdivisions, in other words, which are descendants either of the social insects or of man.

Now it seems to me that insects must be ruled out. In the first place, the insect societies are clearly in second place to human-society as far as control of environment is concerned and there is no coming from behind in evolution. (Remember I don't say that insects may not out-survive man despite this.) Secondly, they are already too specialized and too inflexible to reverse their ground and gain the necessary flexibility for a higher multi-organismic society. In evolution, specialization is invariably a one-way street and moves only in the direction of more specialization.

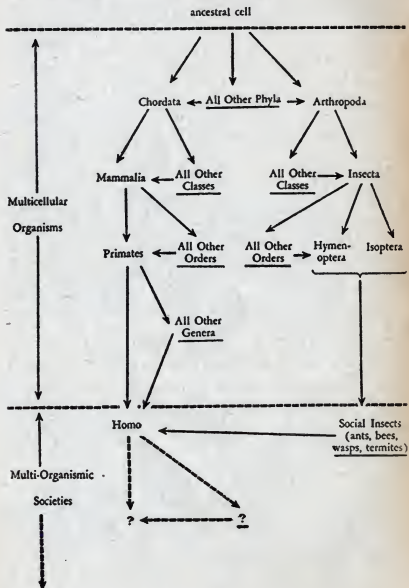
The only possible ancestor of the multi-organismic society, then, is man who is, physically, a relatively unspecialized animal except for his brain; and mentally, thanks to his relatively poor supply of instincts, is equally unspecialized.

The possibility that man will be the ancestor of the multi-organismic society is strengthened by the fact that he represents, for the first time in evolutionary history, an organism which is consciously aware of the competition of other organisms and will surely make a special effort to wipe out any new group which threatens his own overall superiority. Super-chimpanzees, unless overwhelmingly superior from the first, will almost certainly be erased as soon as they are recognized for what they are—barring some individuals retained for scientific observation.

So it might seem that eventually, a family of human beings that are joined together on a nonphysical level—psi forces?—into a multi-organismic society may be established—or, for all most of us know, has been. If they are not recognized for what they are too early, they will take over. In this magazine—which, for one thing, published the unforgettable "Slan"—there is no necessity to beat *that* particular drum.

A more classic device for evolution is to suppose man to be divided into groups which are completely separated geographically, so that the gradual

summing of mutations produces separate species no longer capable of interbreeding. One such new species may then develop the multi-organismic society and will then be to the remaining species as man is to the other mammals—or, perhaps, as man is to the amoeba.



Of course, on Earth there is no longer any chance for a complete geographic separation of any group of men and women over a period long enough to make that work, barring a devastating nuclear war that leaves only remnants of survivors and a completely disintegrated technology.

However, the time may be coming when colonies will be established on worlds other than Earth, on worlds outside the Solar system, perhaps. "Geographic" isolation may then be possible. Men venturing out into space may be like the crossopterygian fish venturing out onto land. They leave as experimenters and end as victors.

It is, of course, repugnant to a human individual at the present stage of his development to think of himself as a mere unit in a multi-organismic society, without will of his own and, whenever necessary, liable to be sacrificed, cold-bloodedly, to the overall good.

But is that the way it will be? It's extremely difficult to imagine what being a part of a multi-organismic society will be like but suppose we consider the analogous situation of cells in a multicellular organism.

Component cells cannot live apart from the organism, but within that organism they maintain themselves as biochemical units. They produce their own enzymes, conduct their own reactions, have membranes that separate them from their fellows, grow and reproduce on their own in many cases.

In a multi-organismic society, the individual may well retain a good deal of mental and physical independence. He may think for himself and have his own individuality; and *also* be part of the greater whole.

As for being sacrificed cold-bloodedly—not unless it were necessary. Skin cells die as a matter of course while the organism lives, but Americans die as a matter of course while the nation lives. Other cells may die on occasion for the good of the whole, but even in our own imperfect society, so must policemen, firemen and soldiers.

We do not allow our cells to be killed for no reason. Thanks to a sensation known as "pain" we take good care of our component cells and would not as much as endure a scratch or a pin-prick if we could avoid it. A multi-organismic society would be as careful of its components and would undoubtedly feel something akin to pain at any harm to its components.

And then there would be a positive gain. In passing from a cell to a group of cells, it becomes possible for the cell-totality to appreciate abstract beauties such as those of a symphony or of a mathematical equation that the cells separately could never conceive of. There may be the cellular equivalent of these beauties in the waverings of a water current or in the engulfing of a tiny organic fragment, but who can argue that a man does not achieve a more exalted rapport with the universe than an amoeba can. Or what man can imagine that the individual cells of his body—which must share somehow in the complexity of his relations to the universe—would rather return to being just so many amoebas?

And, by analogy, who knows what unimaginable sensations, what new levels of knowledge, what infinite insights into the universe will become possible for a multi-organismic society. Surely there will be something then that will compare with a symphony as heard by a man, as that symphony compares with a wavering water current as felt by an amoeba.

THE REFERENCE LIBRARY

By P. SCHUYLER MILLER

THE SEA PEOPLE, by Adam Lukens. Avalon Books, New York. 1959. 221 pp. \$2.95.

Here is an unabashed interstellar adventure yarn that is considerably better than the recent run from Avalon.

Bitter, arrogant, crippled Dick MacCaishe, invalided out of the Space Service, abuses the hospitality of the relatives who have taken him in, when he tries to turn their telepathic daughter over to the ruthless experimenters of the Science Service. He is exiled to the water-world, Skywash, and there makes friends with its strange amphibian race. With their help he not only modifies some of his ingrained views about the importance of the Space Service, and himself in particular, but makes a flying trip to Earth to rescue the caged girl.

The detail is nicely handled, the hero is an insufferable character who slowly turns human, and the plot moves right along. No awards, but it's readable.

THE SECRET OF THE NINTH PLANET, by Donald Wollheim. John C. Winston Co., Philadelphia. 1959. 203 pp. \$2.50.

Winston's series of science-fiction books for teen-age readers is not dead, as this and 1959's companion volume by a new author prove. "Secret of the Ninth Planet" is Donald Wollheim's third for Winston, and about par for the series—sound, but not exceptional, and with one scientific howler that this experienced author/editor just shouldn't have let by, especially in a juvenile which gives a more or less realistic picture of the several planets.

The story starts when it is discovered that mechanisms on the several planets and their satellites are somehow "milking" the Sun of energy, diverting it from the worlds that need it and building up stresses that will cause the Sun to explode in a nova. Burl Denning, who has been in on the destruction of the first Sun-tap station in the Andes and has been somehow energized so that he can shut the things off, sets off in an anti-gravity ship to find and disarm the stations. The voyage takes them to the Moon, Mercury, Venus, Mars, Callisto, and eventually to the mysterious ninth planet, Pluto.

Conditions on the various planets are realistically described, and there are some fascinating life forms, with a grand finale in a Plutonian zoo-museum. The one blooper is one that many magazines and newspapers have made when describing the doings at Cape Canaveral; they describe liquid oxygen as being terrifically flammable, whereas it is what burns other

substances. If such a point weren't made of turning a jet of oxygen into a blast of flame, I'd be less annoyed, but this is just the thing schools seize on to condemn the whole series.

THE STAR CONQUERORS, by Ben Bova. John C. Winston Co., Philadelphia. 1959. 216 pp. \$2.50.

This second of Winston's 1959 juvenile s-f novels is a notch or two above the average for the series, and introduces a new writer—a neighbor of Isaac Asimov's—with a nice hand at interstellar war. I hope he'll try his hand at some adult fare.

Narrator is a young humanoid observer with Earth's Star Watch, in the war against the mysterious Masters for domination of one segment of the galaxy. The Masters never appear; their forces are the reptilian Saurians, by whom Alan Bakerman—properly Ahgh'loun B'khrom'mnin—was brought up, and a variety of other humanoid mercenaries. Some of the Star Watch, quite naturally, are a bit suspicious of Alan's own real loyalties.

In lively action that shuttles from the stars back to Earth, then to the stars again, and at last corners the Masters, we get a vivid impression of the immenseness of the galaxy. The characters are nicely complicated, and there is a Pyrrhic twist to the final victory. While never pretending to be more than a fast-moving adventure yarn, the book manages to be more adult than all but the very best of these Winston teen-age science-fiction novels.

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UNIMAGINABLE REASONS

(Continued from page 3)

already run through most of its multi-billion-year life cycle. Recent astrophysical research has found some stars within this galaxy that appear to be between twenty-five and fifty billion years old.

Other life-bearing planets must have existed in this galaxy not just a few million years earlier, but entire stellar lifetimes earlier.

Why haven't they found us, long since?

If the stars are accessible, if interstellar flight is possible, somewhere, somewhen, in the multi-billion-year research efforts of intelligent life, someone must have achieved it. Why haven't they found us, and communicated with us?

For unimaginable reasons, of course.

But we may be able, now, to see some of the not-reasons that exist where we thought there were, "of course," reasons why they should.

The question has almost always been phrased, "Why don't they contact us?" It may resolve better if we ask, instead, "Why should they?"

Intelligent entities are curious.

Well, that's a good, sound reason of course . . . but that doesn't require *open*, or two-way communication, does it? If one of every hundred million missing persons was missing for unearthly reasons, the high-level aliens would be fully informed. In 1850, a chemist might have needed at least half a pound of a substance to make a definitive analysis of it; today, rubbing a piece of ground glass across the surface of the main mass of metal alloy provides an adequate analytical sample. The smear on the glass is readily analyzed.

It's our curiosity, not theirs, that goes unsatisfied.

But how about the planet itself; wouldn't an intelligent, dynamic race want the planet?

Why? For minerals? Given full, free access to, and use of, space—which must be assumed if we assume interstellar aliens—the requirements for minerals are far more readily fulfilled by asteroids and similar cosmic debris than by laboriously carving through a planetary crust.

"If you're so smart, why aren't you rich, huh?"

Maybe because I've got better sense than to waste my time keeping track of wealth for which I have no need? Maybe because my concept of "wealth" is quite unimaginable to you? Maybe I don't strive to achieve possession of real estate because I have no need for it, nor want it. Maybe the aliens simply don't want planets—this, or any other, save perhaps that unique-in-all-the-Universe individual world on which their species originally evolved.

It needn't be so different from Earth as to have a methane-ammonia atmosphere, either. The air we breathe, the good smell of sweet, fresh air—this is the metabolic product of countless plants and animals that have spent some billions of years evolving together. Perhaps, to an alien from another oxygen-water planet it smells approximately like a burning garbage dump. Out in the middle of a major ocean, you don't get that odor we

identify as "the smell of the sea"; the odor apparently comes from the mud and its inhabitants along the continental coasts.

Two motives standard in BEM-style science fiction can be dismissed quickly. Aliens aren't going to invade Earth, and breed human beings for meat animals. It makes a nice background for horror-fantasy, but it's lousy economics. It takes approximately ten years to raise one hundred pounds of human meat, and at that it takes high-cost feed to do it. Beef cattle make better sense—even though that louses up the horror motif.

And that is, of course, assuming the improbable proposition that the aliens' metabolism can tolerate terrestrial proteins at all.

If they can, of course, it's much easier to get local natives, ideally adapted to the planet's conditions, to raise the cattle. Inherently much cheaper than trying to do it yourself. Besides, the local yokels can be paid off in useless trinkets like industrial diamonds, or tawdry little force-field gadgets, children's toys that won't cut anything with any accuracy better than a microinch.

Then there's the old one about raiding Earth and carrying "Earth's fairest daughters" away as love-toys on some alien planet. Possible motive . . . if you'd define "fairest" adequately. If the aliens happen to come from a bit heavier planet, the proposed raids on "Earth's fairest daughters" might turn out to be very distressing to the gorilla population. In those "Earth's fairest daughter" bits, I've noticed, nothing whatever is said about the intellectual capabilities of the "fairest"; a charming young gorilla maiden would pass the only test proposed . . . if your eye for looks were slightly different. And obviously these interstellar harem-agents aren't interested in offspring anyway; there couldn't possibly be any.

This leaves one other imaginable reason for aliens invading Earth—one of the old, stock motivations. For slaves.

Little by little, over the last few centuries, Earth has been growing up a little. Slave raids used to be very common—practically a standard commercial operation. Slaves were a major item of the world's commerce. Like it or not, idealists can plead, brotherly-love addicts preach, and bigots rave, but nothing much gets done, on anything more than a local in time-and-space basis, unless Economics agrees. If Economics says X, and the idealists say Y . . . X gets done.

The slave trade wasn't stopped by preachments, ideals, or any moral force. It wasn't stopped by Man's increasing kindness to his fellow man on an idealistic basis, either. Horse-stealing wasn't stopped by laws, executions, or any other method tried during the last six thousand recorded years of history; it stopped only when it became more profitable to steal automobiles.

The great difficulty with the problem of slavery is that the definitions given for "slavery" are completely useless, and totally non-objective. There's no use looking up the definition in a dictionary, or a law book; the definitions don't correspond with the reality of human experience. "Slavery," so far as I have been able to work it out, in several years of consciously directed research, is almost purely an emotional, not a legal-objective, situation. An inherent part of the necessary definition of "slavery" must, then, be "an emotionally painful situation." If it isn't emotionally painful, no matter

what the situation may be objectively, it isn't slavery—it's something else. And this means "emotionally painful in actual fact, to the individual involved"; if the situation would be emotionally painful to you, then you, in that situation, would be a slave—but if it is not emotionally painful to the actual subject, then it isn't slavery.

Keeping a fish under water isn't cruelty; for a dog or a man in the same spot, it is cruel. Throwing a catbird off the top of a tall building isn't cruelty; throwing a cat off would be.

One of the great confusers in the problem of slavery is serfdom; serfdom looks, to most modern men, so much like slavery that the two are almost hopelessly confused.

The essential difference is this: in a serfdom, the serfs are fish being assured of being kept under water—they're men guaranteed security in the way of life they choose.

A perfect example of serfdom in nature is the ant and bee society; the workers are serfs, protected by soldiers. There's perfect division of labor; soldiers don't work, and workers don't have to fight, while the queen does nothing but reproduce.

In noble-and-serf societies, the noble has the sworn duty of protecting, defending, and maintaining the established way of life, defending it against all comers, either invaders from without or saboteurs from within. Typically, the noble of European tradition was not allowed to work; the soldier ant isn't either.

The serf likes serfdom; it is not unpleasant to him—and it is not, therefore, slavery. That *you* wouldn't like it has no bearing on the matter whatsoever.

Serfdom, however, is inherently an "evil" thing—"evil" has to be in quotes, of course, but I can define what I mean. It's an effort to duck out from under one of the fundamental laws of the Universe; the Law of Change. The sworn duty of the noble is to *maintain what is*; they defend against change. The ant and bee societies have achieved a highly successful serfdom; they haven't changed in hundreds of megayears. In achieving perfect security and stability, they have settled down in a dead-end alley of evolution. An ant worker is *not* a slave; it is a serf, and can't imagine living otherwise. If it is forced to live otherwise, it dies shortly, and in misery.

Serfdom is always pleasant to the serfs; therefore it is not slavery. And it is invariably destructive, because it is a violation of the fundamental force of Evolution and Change.

All right; slavery is invariably "an emotionally painful situation," while serfdom is not. But the best definition of slavery I've been able to find so far is this: Slavery is a system in which one group of individuals, the slaves, are forced by another group, the masters, *to learn something they do not want to learn*.

The essence of slavery is the exact inverse of serfdom; slavery is imposed, undesired change.

The consequence is that slavery is not inherently, automatically destructive or injurious; it is automatically and inherently painful. But "hurt" and "injure" are not by any means synonymous; they just feel that way at the time. Dental work commonly hurts; it has been used as a means of torture. But that doesn't mean that painful dental work is injurious!

Dental work isn't always painful, of course; education is not always

painful, either. I am not implying that all education is slavery—but I am suggesting that all slavery is educational!

A child in a modern home is a true slave; he is forced to labor at tasks he does not choose, under threat of physical, mental, and/or emotional punishment. If he seeks to escape, the legal mechanisms of the society capture him and force him to return. He is forced to work without remuneration, for a period of time not under his control. The fact that he does not choose to learn arithmetic makes no difference; it is imposed on him willy-nilly.

The most unpleasant thing about this definition of slavery is, of course, that it makes it perfectly clear that slavery can be a highly beneficial experience.

And that, of course, causes an immediate sense of outrage and protest; slavery is invariably an emotionally painful situation, and what could be more obnoxious than the idea that something emotionally painful can be beneficial!

The distinction between good and evil slavery is simple in principle, but anything but simple in practice. "By their fruits ye shall know them." An imposed lesson which forces a desirable, productive growth is beneficial, however painful. If the imposed lesson decreases the stature of the individual, he is a victim of evil slavery. The fact of emotional pain in the situation is not relevant; it is not true that a man becomes "a slave to morphine"—he becomes "a serf to morphine," because the experience is peaceful, pleasant, and comfortable.

I assume that you have read George Orwell's "1984"; you're not a proper member of the group Science-fictioneer if you haven't. In that story, the proles are serfs; Winston is a slave. In every human serfdom, there is an inner slavery system; the occasional peasant-born man who wants to change, grow, and change the static culture around him is necessarily a slave. Because the nobles in the system are sworn to defend the Way of Life against all comers, invader or saboteur alike. Every would-be tradition-changer is an enemy of the Society. The nobles must, under their assignment of duty, stop his efforts.

First, they will seek to persuade the rebel to appreciate the beauty and warm comfort of the Sacred Traditions. If he yields at this stage, he does not become a slave; he learns the lesson of serfdom without reaching the painful stage.

If he persists, he will be punished. He must be taught the lesson he does not choose to learn; at this point he is a true slave.

If he cannot be taught, he must be destroyed for the safety of the Society. Both noble and serf will agree on that—and they will agree on it whether the rebel is a peasant's son, or the son of a high noble. For the nobles are serfs, too; they, too, are bound to the stasis-effort.

Winston Smith, in "1984," is a slave; the effort of the masters is to force him to learn the lesson of accepting the validity of their ideas. Now a slave has two levels of defense—which Orwell brings out clearly. The first, of course, is the effort at physical escape; to escape doing what his masters impose. If he is forced to acknowledge that physical escape is impossible,

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his second line of defense is, essentially, "You can make me do what you want, but you can't make me like it!"

The shockingly repugnant ending Orwell achieved was the final, and utter destruction of Winston's will; he discovered that he *loved* Big Brother. He was a broken slave; he loved the hand that had whipped him into submission.

The concept is violently repugnant, isn't it?

That's fine; we're in agreement. Only . . . now tell me, why is Shakespeare's "The Taming of the Shrew" a delightful comedy? Katherine, the shrew, is, in the course of the play, subjected to physical, mental, and emotional punishments that finally force her to give up not only her rebellion, and her hope of rebellion, but even her will to rebel. She winds up loving her master.

Just like Winston in "1984," isn't it?

We both know it's different; I'm simply inviting you to clarify your strong feeling of the difference so that you can express to someone else the "unimaginable reasons" that make Katherine's painful emotional situation rate as comedy.

True serfdom is always pleasant for the serfs—and always evil; it's a drug habit. True slavery is always painful—and not always evil.

The reason the world has given up "slavery" in the last few centuries is fairly simple; the old system was not slavery, but serfdom, in practically all cases. Serfdom is economically usable; the serf works contentedly, and is a trustworthy and satisfied worker.

A true slave is undergoing an emotionally painful experience; he can be used only for the coarsest type of work because he will, of course, seek to sabotage his masters wherever he can. Typically, agricultural workers can be true slaves, since armed overseers can force them to work. Obviously, they cannot be used as domestic servants, clerical workers, or industrial workers. One does not leave a baby in the charge of a slave who hates his master.

Today, the rate of change of technology makes serfdom nonexistent, or at least economically impossible. You can't use slaves in delicate technological work.

So when we have a still higher, and wider-ranging technology, and are free to voyage among the stars, free to seek out a thousand more primitive worlds full of slaves to be had for the taking—their defensive weapons would be futile against ours!—we're going to be frustrated again.

When we can do it . . . we will no longer be able to want to do it. What is the use? It would cost so much more to teach those stubbornly resistant captives! Robots are cheaper, and a darned sight more dependable than a slave.

Sure there must be Others out there with vastly greater powers than we now have. They could take us any time they wanted.

But if they want to at all, it must be for unimaginable reasons. And from the fact that they haven't, we can vaguely guess that there must be unimaginable-unimaginable reasons that offset the unimaginable reasons!